# Annals
## of the
# Missouri Botanical Garden

Vol. 53 1966 No. 3


# CENTRAL AMERICAN AND WEST INDIAN SPECIES OF INGA (LEGUMINOSAE)[1]


BY JORGE LEÓN[2]
Missouri Botanical Garden, St. Louis



ABSTRACT

Four new species of *Inga, I. allenii, I. mortoniana, I. squamigera* and *I. tenuipedunculata,* are described among 56 recognized from Central America and the West Indies. The species are divided into three sections with the largest sect. *Inga* further segregated into 13 series many of which are reported as new.


Among the tropical American *Leguminosae,* the genus *Inga* Scop. is outstanding in the number and complexity of its species. Although Central America is at the northern extreme of their geographic distribution, the many endemics and the intense cultivation of some species make this area particularly interesting for a monographic study. An attempt of this kind was made by Pittier (Jour. Dept. Agr. Porto Rico **13:** 117-177, 1929) who had years before composed a general revision of the genus (Contr. U. S. Nat. Herb. **18:** 173-224, 1916). Pittier dealt with the Central American species as a unit independent of the South American group; this fact and his inadequate herbarium representation, as well as the unnecessary creation of new series, restrict the general usefulness of his monographs. The only other treatment for the whole area was by Britton & Rose (N. Amer. Fl. **23:** 2-16, 1928) which, as pointed out elsewhere (Schery, Ann. Missouri Bot. Gard. **37:** 189, 1950), is of limited use. Britton & Killip (Ann. N. Y. Acad. Sci. **35:** 110-124, 1936) studied the *Mimosaceae* of Colombia and their work is important in relation to the Panamanian species.

---

[1] Submitted in partial fulfillment of the requirements for the degree of Doctor of Philosophy at Washington University in affiliation with the Missouri Botanical Garden.

[2] Present address: Instituto Interamericano de Ciencias Agricolas de la OEA, Lima, Peru.


ANN. MISSOURI BOT. GARD. **53** (3): 265-359, 1966.

The previous issue of the ANNALS OF THE MISSOURI BOTANICAL GARDEN, Vol. **53**, No. 2, pp. 115-264, was published on November 7, 1966.

Differing from previous revisions, the one offered here considers the representation of *Inga* in Central America and the West Indies as a part of the South American complex. One result of this interpretation has been to reduce many names and to revive some old ones, notably several by Willdenow.

The standard herbarium techniques have been used in this study. However, field work in Central America plus mass collections of two cultivated species have helped considerably in the understanding of the range of variation.

## HISTORY OF THE GENUS

Plumier (Nov. Pl. Amer. Gen. 13, *t. 19*, 1703) was the first to describe *Inga* as a genus basing the name and characters on the description of Marcgravius (Hist. Pl. Bras. 111, 1648) and employing the vernacular name applied in Brazil to these trees. Linnaeus (Hort. Cliff. 209, 1737; Sp. Pl. 516, 1753) included it within *Mimosa* where it was maintained until Scopoli (Introd. 298, 1777) reinstated its generic rank. (For details of early history, see Gutiérrez, Rev. Fac. Nac. Agr. Colombia **7:** 27-33, 1947).

During the subsequent decades the concept of the genus was extended to cover many species that are now included in allied genera, such as *Pithecellobium*, *Calliandra*, *Zygia*, *Acacia*, etc. This was owing mainly to the splitting of *Mimosa* as understood by Linnaeus, as well as to the discovery of many systematic novelties. Such a wide sense for *Inga* was held by de Candolle (Prodr. **2:** 432, 1825), Martius (Flora **20:** 113, 1837), Kunth (Mimos. 35, 1819; Nov. Gen. Sp. Pl. **6:** 283, 1823), and especially by Willdenow (in L., Sp. Pl. **4:** 1004, 1806) to whom many modern authors attribute the authorship of the genus.

Our present interpretation is based on that of Bentham (in Hook., Lond. Jour. Bot. **4:** 577, 1845) who restricted *Inga* to the once-pinnate-leaved species of the American *Acaciae*. Later, in his classic monograph of the *Mimosae*, Bentham (Trans. Linn. Soc. **30:** 600, 1875) created the tribe *Ingae* to accommodate *Lysoloma*, *Calliandra*, *Enterolobium*, *Pithecellobium*, *Inga*, *Affonsea*, etc. Within the tribe, *Affonsea* and *Inga* are differentiated again from the other genera by their once-pinnate leaves. In more recent times this delimitation of Bentham has suffered only one important change: a group of Central American species with the above-mentioned characteristic has been separated from *Inga* on account of their very distinct fruits, and placed in *Pithecellobium* § CAULANTHON, a taxon to which Britton & Rose (N. Amer. Fl. **23:** 29, 1928) gave a generic rank under the name *Cojoba* (s.s.).

*Affonsea* St. Hil. is the genus most closely related to *Inga*. Bentham found it difficult to differentiate these genera on foliage characters alone; *Affonsea* seems to be an old or primitive genus with a several-carpelled gynoecium, a character that once in a while appears in *Inga*, probably a remainder of an ancient and common stock. The maintenance of *Affonsea* as a separate taxon based on an important floral character is confirmed by its geographic distribution that centers around the ancient geological shield of southeastern Brazil.

## Morphology

*Habit.* All the species of *Inga* are well developed trees varying from 3 to 25 m tall in the Central American species. The tallest species, *I. altissima* Ducke of the Amazon, sometimes reaches more than 40 m while one of the smallest, *I. cookii* Pittier of Guatemala, stands only 3-4 m, an unimportant element in the cloud forest. *Inga* often exhibits the typical mimosaceous pattern of branching, forming an umbrella-like top; but more commonly its branching is profuse and irregular. Little is known of its root system; the experience of coffee growers tends to mark some species, especially those of § BOURGONIA, as trees with a highly divided and shallow system; in § INGA the branching is less frequent and deeper. Some of the rain forest species have poorly developed buttresses.

*Indument.* The indument found upon the young parts and flowers tends to disappear with age in the majority of the species, although in some it is permanent. It offers good key characters in the delimitation of sections and series, and even in the diagnosis of some species it may profitably be used. A dense, ferrugineous pubescence is characteristic of some species in ser. CALOCEPHALAE, while in ser. VULPINAE two main types are found, both ferrugineous; short and sparsely pilose or setose. The flowers in ser. DYSANTHAE are covered with a lanose indument. In § BOURGONIA, in contrast, the pubescence is scarce, and restricted to the nerves of the leaves and the tips of the perianth whorls. As usual in the family, the hairs are unbranched and glandular, and often have a typical thickening at the base.

*Leaves.* The leaves of *Inga* are once-pinnate, an unusual pattern in the *Mimosaceae.* The shortly petiolulate leaflets are arranged oppositely on a winged or cylindric rhachis, the terminal leaflet lacking and replaced by a linear appendix. The leaflets are slightly longer on one side of the rhachis, giving a somewhat asymmetric appearance to the whole leaf; in the uppermost pair they are larger and have narrow and oblique bases, while in the lower pairs they decrease in size and the base tends to be broader and symmetric. The leaflets are bifacial, more glabrous and lustrous above, with denser pubescence and prominent nerves beneath. According to the observations of Coester (Ueber die anat. Charak. der Mimos. 159-173, 1894) the internal structure of the leaves is very similar in the species that belong to the same series.

The rhachis has received considerable attention as a taxonomic character. It has been used to separate sections and series, based on its terete or winged appearance, and plays an important role in most keys at the specific level. Although in some instances it furnishes a rather constant character its usefulness probably has been overemphasized, for in the same species it may vary from broadly winged to subalate (wings in the upper section only) to completely terete (*I. oerstediana,* etc.)

A very striking feature is the presence of well developed interfoliolar glands. This type of extrafloral nectary is probably more complex in this genus than in any other of the *Leguminosae* and its function and development are practically unknown. Such glands correspond to the rhachial type (Zimmermann, Beih. Bot. Centralb. **49:** 175, 1932) and as a rule are solitary at the insertion of the folioles,

although in some species, as *I. hayesii*, they are commonly found in pairs. In *I. goldmanii* they also occur on the midrib of the leaflet near its insertion on the rhachis; similar cases are found only in *I. adenophylla* and *I. pruriens* of South America. The shape of these glands varies from filiform and curved, in *I. saffordiana*, to thin and conic in ser. VULPINAE, to short and patelliform in ser. INGA; finally, in some species the glands are practically obsolete. Their shape and size varies with the age of the plant, being better developed in the young leaves and seedlings and often non-existent in the old leaves. As a key character they have received too much attention; their main importance is as a secondary character in separating sections or series rather than at the variable specific level. The extrafloral nectaries in *Inga* attract many insects. In the Piarco swamp, in Trinidad, the author observed in *I. pilosula* that they are used as traps by large red ants to capture smaller insects.

The growth of new foliage may occur simultaneously with the opening of the flowers, as in *I. ruiziana*, immediately thereafter, as in *I. marginata*, or completely independently of flowering, as in *I. densiflora*. The young leaves appear in conspicuous terminal flushes and are often, as in many tropical plants, bronze to red in color and of very delicate texture. The color of the new foliage differs according to the species and varies from light green (*I. mortoniana*) to pink (*I. marginata*) to ferrugineous red (*I. edulis*), and only lasts for a few days. During these short periods the trees present quite an attractive aspect. Observations on *I. marginata* in two localities with very different climates, and for several years, show that new flushes occur almost every two months, and that their occurence does not seem to be related to external factors but to the internal rhythm of the plants.

*Proliferations.* In certain species, particularly in *I. punctata, I. sapindoides* and *I. edulis*, large proliferations occur on the branchlets. Their formation has been attributed, in the cultivated *I. feuillei* of Peru, to the action of bacteria. These spherical structures attain a diameter up to 4-5 dm, and are formed by a proliferous and condensed ramification covered with calyx-like structures which open in age to disclose many minute buds subtended by bracts; normal or reduced leaves seldom appear.

*Inflorescence.* The basic structure of the inflorescence in *Inga* is the raceme. The most common form is a simple raceme that appears solitary or in groups, either terminal on the new growth or axillary on the defoliated nodes of the older wood, subtended by free or whorled bracts. Some species offer particular variants: for example, in *I. mortoniana* the racemes are grouped on short spurs on the branches, leafless but with a terminal vegetative bud; in other species the flowers appear on a terminal shoot, also without leaves, which at the end of the flowering season continues its growth and produces new leaves *(I. ruiziana,* etc.*)*. In *I. saffordiana* flowers have been reported to grow on the trunk and main branches, but it is more probable that they are produced on a thick spur rather than directly from the trunk. This is the only reported instance of cauliflory in *Inga*, although it is of common occurrence in the allied genus *Pithecellobium*.

The axis of the inflorescence is divided into a lower peduncular portion and a

floral rhachis. The peduncle varies from slender, sometimes filiform, to stout and woody. In some species of § BOURGONIA it is characteristically short, giving a cylindric appearance to the inflorescence; the floral rhachis is restricted in the other groups to the upper part of the axis. The flowers are subtended by bracts, which are persistent in some groups (ser. TETRAGONAE), caducous in others (ser. INGA).

The transition from raceme to spike is frequent in many species and in some is a permanent character. A further development in the structure of the inflorescence in *Inga* is attained when the raceme is contracted into a short, mace-like receptacle with the individual flowers arranged in compressed spirals, thus giving to the inflorescence a spherical appearance. In several species, as *I. heterophylla* and *I. quaternata*, it is possible to observe intermediate stages between a short raceme and a globose inflorescence even in the same branch. Bentham created two sections to accommodate all species with a mace-like receptacle: § LEPTINGA, where all the flowers are markedly pedicellate, and § DIADEMA, with flowers sessile or almost so. A study of the groups shows all kinds of intermediates and for this reason no validity is here assigned to § DIADEMA; Ducke (Bol. Tec. Inst. Agr. Norte **18:** 20-34, 1931) and Macbride (Field Mus. Publ. Bot. **13:** 6-47, 1943) have discarded it in local treatments of the genus.

Several flushes of flowers occur during the year and the blooming period may be different for species growing side by side. The inflorescences burst into bloom simultaneously over wide areas in a typical mimosaceous fashion (Burkart, Darwiniana **8:** 33, 1948), and last for only a few days. The flowering is acropetal, and many of the upper buds never develop. Anthesis is more frequent during the afternoon and the flowers are visited by many species of insects, particularly *Coleoptera*.

*Flowers.* The arrangement of the flowers in the inflorescence of *Inga* follows an irregular, often spiral pattern. The flowers vary from sessile to long-pedicellate in the same species; common in ser. INGA is a type of pseudopedicel developed at the expense of the lower part of the calyx.

According to Thompson (Publ. Hartley Bot. Lab. **7:** 47-50, 1931), the different parts of the flower are arranged on a spiral pattern following a 2/5 sequence. There is a more or less well developed receptacle on which are based the calyx, the corolla, the staminal tube and the gynoecium. The corolla and the staminal tube are fused for some distance at the base, a character that Baillon (Hist. Pl. **10:** 45, 1870) mentions also to occur in certain other groups of the *Mimosaceae*. A. Richard (Nouv. Élém. Bot. **2:** 221, 1833), assuming a receptacular nature for this fusion, was led to conclude that the calyx, whose insertion is inferior to this level, is not actually a calyx but an involucre. Observations of many flowers show that the calyx is inserted on the receptacle, although this is not completely clear in some cases owing to its thickening at the base. De Candolle (Mém. Leg. **1:** 39, 1825) considered the staminal tube and the corolla as hypogynous and mentions the occurrence of a similar receptacular structure in the *Swartzieae*. In some species there is an inconspicuous disc, between the staminal tube and the gynoecium, that possibly represents an inner reduced whorl of stamens.

The calyx consists of five valvate segments, united to form a tubular structure in the majority of the species, although campanulate in § BOURGONIA and in *I. saffordiana* broadly turbinate. The five divisions or teeth are generally of equal size, but in some species such as *I. acuminata*, they are very irregular, some becoming obsolete. The calyx, in shape and size, furnishes perhaps the best taxonomic character in the genus.

The corolla is always gamopetalous, tubular to tubular-funnelform, short or elongate; the relative size and shape, as well as the indument, are of importance in both specific and sectional delimitation. The total length of the corolla was used by Pittier (Jour. Dept. Agr. Porto Rico **13:** 122, 1929) to separate the § PSEUDINGA Benth. into two subsections: TENUIFLORAE, with the corolla less than 2.5 cm long, and GRANDIFLORAE, with the corolla more than 2.5 cm long or, if shorter, then very broad. The indument is sparsely to densely pilose and generally appressed, and is always found on the outside only.

The androecium consists of numerous stamens fused at the lower part of the filaments into a definite tube of irregular thickness. The tube is exserted or included in relation to the corolla and, although many authors have founded specific differences on this character, it is in general without any sound taxonomic significance. The number of stamens varies so widely in the same species that it also is of restricted use. The filaments at anthesis are the most conspicuous part of the flower; they are white in most of the species, but yellow in *I. pilosula*, while in ser. DYSANTHAE there is a pinkish tinge both in the corolla and the filaments. The two-celled, eglandular anthers contain in each theca two massulae formed by 16, 24, or 32 pollen grains which tend to remain together after shedding; this is probably one of the main factors determining the high sterility in *Inga*.

The gynoecium is formed by a sessile or slightly stipitate carpel ending in a filiform style usually longer than the staminal filaments. The ovary is elongate, with two series of anatropous ovules on the ventral placenta. The shape and indument vary in the different species. The style bears a discoid, entire or dissected stigma.

*Fruit.* The fruit in *Inga* varies from thin and dry to thick and fleshy. It has no definite pattern of dehiscence. Externally it shows four sides: two corresponding to the "margins" or vascular strands; the other two to the valves or intermediate areas. The different development of these four sides has produced three main types of legumes: 1) flat, when the valves are very broad in relation to the vascular margins—this is by far the most common type; 2) tetragonal, when the four sides have more or less the same width; 3) subterete, if the marginal faces are as wide as the valves or wider. In this case the development of vascular bundles gives a twisted, rope-like appearance to the legume. Intermediate types occur, but the general morphological characters mentioned above are of great significance in delimiting sections and species.

The fleshy structure of the legumes in *Inga* was the main character used by Willdenow in separating that genus from *Acacia, Mimosa*, etc. Although in some species the valves are thick and have a fleshy endocarp at maturity (*I. jinicuil, I. densiflora*, etc.), in the majority the walls of the fruit are thin and rather dry.

*Seeds and germination.* From the biological standpoint the seeds of *Inga* are the most interesting part of the plant, owing to the nakedness of the embryo and its "viviparous" germination. The first observations on this phenomenon were by Borzi (Rendic. Lincei **12:** 131-140, 1903) who, in a classic paper, dealt in considerable detail with the seeds of *I. feuillei* DC., introduced at the botanic garden in Palermo. Similar observations made on Central American species permit a broader picture of the phenomenon.

The young seed is completely covered by a thin, pulpy testa that in age develops a series of layers derived, according to Borzi, from the malpighian stratum. The outer layers are formed by white, brilliant, thin-walled cells, rich in sugar and of a cotton-like appearance, while towards the inner side of the seed-coat the cells tend to be thicker and less juicy. This white, fleshy aril, referred to in the old publications as the 'pulp,' is the main edible part of the legume, and through selection has attained considerable thickness in some varieties.

When the seeds reach maturity the seed-coat opens at the distal end along longitudinal sutures, owing to the growth of the cotyledons, and eventually becomes completely separated from them, leaving the embryo naked; the dark green cotyledons tightly enclose it, their bevelled and undulate margins being complanate except at one end where each divides into two lobes, the four lobes forming a cavity through which the radicle eventually emerges. At maturity the cotyledons start to separate but generally with not enough force to cause the dehiscence of the pods; the radicle, nevertheless, starts growing and may attain several centimeters in length before the eventual opening of the legume, if indeed this ever dehisces. The growth of the plumule is meanwhile kept at a very low rate.

When the legumes are mature the splitting of the valves is often helped by birds, especially *Psittacidae* which visit the fruiting trees in large flocks. They open the pods, remove the seeds, eating the aril and allowing the embryos to escape and fall to the ground. Other animals and even man contribute likewise to the dispersal. Once the embryo reaches the ground, the already advanced germination accelerates and the hypocotyl develops rapidly, growing in a spiral. As a protection against excessive transpiration and high temperatures it is covered with minute, ferrugineous hairs in some species, while in others the outer cells are filled with a red pigment. The cotyledons, which have a large supply of food, are protected from the loss of water by several layers of cutinized cells rich in tannin that permits them to be subjected to considerable desiccation without affecting the growth of the seedling. The embryos, however, lacking a protective coat, have to find a very favorable habitat in order to develop; this is partially compensated by the large number of seeds produced per tree despite the high floral sterility. The frequent occurence of larvae of *Diptera* (*Anestrepha* ssp.) also contributes to prevent possible overpopulation.

## Geography

The geographic distribution of *Inga* is restricted to the American tropics with some penetration into temperate areas both north and south. The total range extends from Durango and Coahuila (25° N) to the delta of the Plata River (34° S).

The collections available indicate that most of the species have continuous ranges. Some of them are very wide: from Mexico to Brazil (*I. vera, I. punctata, I. quaternata*); from Guatemala to Brazil (*I. thibaudiana*); from Costa Rica to Paraguay (*I. marginata*). The center of speciation appears to be the Amazon basin where, according to Ducke, there are 89 species. From this area the number diminishes in all directions. We find towards the south: Matto Grosso, 9 spp; Rio Grande do Sul, 4 spp.; Uruguay, 2 spp.; towards the north: Venezuela, 30 spp.; Trinidad, 11 spp.; Guadeloupe, 3 spp.; Guatemala, 15 spp.; Coahuila, Mex., 1 sp. It is difficult at present to locate secondary centers of speciation, but recent explorations in western Colombia show that this area is second only to the Amazon basin in number and complexity of species.

A similar pattern of distribution is observed in the different sections and series which are richer in species in the Amazonian region and have an area progressively restricted in all directions.

Despite what some morphological characters would suggest (Stebbins, Amer. Nat. **86:** 40, 1952), it seems that all species in this genus tend to grow in mesophytic to hygrophytic habitats. The frequency rate in the Amazon, according to Ducke, shows that in the hyleia, *Inga* is the predominant *Leguminosae*, in the capoeiras and the mata virgem their number is still high, while they are lacking completely in the campinas or campos altos. A similar distribution is found among the dry and wet areas in Central America. In the open forests of Guanacaste, Costa Rica, only two species have been found, both growing at the margins of rivers, while no less than 12 are reported from the rain forest in the northern part of that country.

As may be surmised, the means of dispersal preclude a rapid expansion and, despite the protective devices against drought found in the embryo, the seedlings require a clean and wet ground on which to grow. It is because flooded areas provided such a habitat that *Inga* is so common in them and also because whole fruits are frequently transported by rivers. *Inga* has not attained, however, the narrow adaptation to this habitat that occurs in some species of *Pithecellobium*. In areas where precipitation reaches a critical point for *Inga*, as in the Lesser Antilles, it is restricted to the high forests, where it becomes very successful. Its occurrence in adjacent savannas seems to be rather accidental.

The geological history of the area may help to explain the present geographic distribution. Fossils attributed to *Inga* have been found in the Cretaceous, both in Europe and North America, in Panama (Oligocene), in Costa Rica (Miocene) and in Bolivia (Pliocene). All consist of leaf impressions, and it is very difficult to assign them with certainty to *Inga* rather than to some other related genus. According to the present views on the biogeography of the area (Schuchert, Historical geology of the Antillean-Caribbean region, 106-110, 1935), it is quite possible that a migration of species from South America could have reached the Central American mainland in the upper Cretaceous. One of the most widely distributed species, *I. vera*, seems to have taken two routes of migration in Central America; one to northwestern Mexico, and the other towards the Greater Antilles; the latter were connected to the continent until the middle Miocene, which may explain the present

distribution of that species in Jamaica, the eastern tip of Cuba (introduced?), Hispaniola and Puerto Rico.

A different history occurs in the Lesser Antilles. The species found in this group of islands are markedly of Amazonian-Venezuelan origin. Of the 11 species found in Trinidad, 10 also occur in Venezuela. Two of them extend to Tobago and Martinique, while only one, *I. fagifolia*, is found farther than the Anegada passage which separates the continental shelf of the Greater Antilles from the volcanic arch extending from Anguilla to Grenada. *Inga fagifolia* is found in all the Lesser Antilles, Puerto Rico and Hispaniola but does not occur in Jamaica, an island which has been thoroughly explored. This species, of which closer allies are found in central and southern Brazil, extends to Mexico in one direction but evidently its distribution to the Lesser Antilles and Hispaniola occurred *via* the Trinidad-Venezuela connection. As for many other plants, its distribution in the Lesser Antilles and Hispaniola may be explained either by the existence of a land bridge connecting the islands, a theory that has few supporters among geologists, or through waif dispersal. Two of the endemics of the Antilles, *I. dominicensis* (Dominica) and *I. martinicensis* (Martinique, Guadeloupe), are restricted to the old nucleus of the Lesser Antilles; the third, *I. venosa*, a poorly known species, occurs in Trinidad.

## Economic Importance

Although none of the species of *Inga* has a basic economic importance, they are useful in a wide variety of ways and man has paid close attention to these trees in different stages of his civilization.

*Fuel wood.* Since colonial times, especially in the Antilles, the different species of *Inga* have supplied a good fuel wood for domestic and industrial uses. Oviedo, in 1535, mentions this use in the first sugar mills established in America, located in Hispaniola, and centuries later Père Labat refers to the same use in the French Antilles. At present it is of considerable importance in the coffee growing areas of Central America and Colombia; these densely populated regions depend for fuel production on the wood of *Inga* trimmed off each year from the shade trees in the coffee fields. As natural supplies are scarce and the consumption high, in some places all the fuel is supplied from such trees.

*Shade for cacao and coffee.* One of the most interesting discoveries of pre-Columbian agriculture was the use of leguminous trees for the shade of cacao. Cacao grows naturally under the tall trees of the rain forest, and when the early Indians started its cultivation in a formal way it was probably after long experimentation that they found that leguminous trees not only furnish a good type of shade but even increase the yield of cacao. This occurred, of course, several centuries before the discovery of nitrogen fixation. The first tree so used was *Gliricidia sepium* (Jacq.) Steud.

In cultivation of coffee, the effect of shade is to lengthen the life of the plant by reducing overproduction, maintaining a high fertility rate in the soil and preventing erosion. For this purpose *Inga* trees are planted at regular intervals in the coffee plots, and by corrective pruning they attain the size and shape desired

by the planter. The use of *Inga* as shade is discussed in the standard works on coffee culture (Marrero, Caribbean Forester **51:** 54-71, 1954). Several species have been introduced into Africa (Angola) with the purpose of finding better shade trees for coffee.

For their rapid growth and the large quantities of organic matter produced *I. edulis, I. oerstediana, I. speciosissima* and others are preferred by the farmers. Very often the shade is not provided by trees of only one species, but several are planted together.

Within the genus, also, selection for the most desirable species is progressing. *Inga paterno,* once a favorite, now is almost eliminated by a witches'-broom disease that reduces its foliage considerably. In *I. densiflora* a pink fungus attacks the branchlets and seriously damages the tree. Among others, an important problem at present is to find species or varieties of higher resistance to the fungus disease and fruit flies (*Anestrepha* spp.).

*Fruit.* The utilization of *Inga* as fruit trees is an ancient one and probably started independently in different places. In the lower Amazon basin it was concentrated on *I. edulis* and *I. cinnamomea,* although the varieties of the former as found in Central America are scarcely edible. In southern Brazil the species used were *I. affinis, I. uraguensis* and *I. barbata.* In the higher Amazon *I. densiflora* is frequently planted and the type specimen comes from a cultivated tree. Ducke has pointed out that the plants in cultivation produce better fruits than the ones growing in the forest. Apparently selection already is advanced.

A second center of domestication is found in Peru where *I. feuillei,* the *pacay,* was widely cultivated before the Paracas culture. The trees are abundant in the coastal lowlands and evidently received much attention from the aborigines since the pods are commonly figured in the ceramics of Paracas, Chimu, etc. Of special importance was the fact that the legumes could be stored for a long period (Yacovleff & Herrera, Rev. Mus. Nac. Lima **3:** 267, 1934), and this explains how its cultivation covered more or less the same areas as the Inca Empire from Chile and Bolivia to Ecuador. *Inga feuillei* is the only species of the genus that has been planted as a fruit tree outside the natural range, in California, Polynesia, Italy, etc.

In Central America the only species that is planted for its fruit is the *jinicuil, I. jinicuil,* the cultivation of which started in Mexico, probably in the highlands of Veracruz. Fruits of this species, as well as of *I. paterno, I. densiflora* and *I. sapindoides,* are commonly seen in the markets, while the less appreciated *I. punctata, I. spectabilis,* etc., very seldom appear. Among the poorer classes in Central America another use is given to the large seeds of some species: these are cooked, cut in small pieces, and eaten with other vegetables.

As indicated before, selection has been directed to obtain larger pods and thicker arils. Further problems that have arisen are to find plants resistant to the attacks of fungi and insects. Up to now the method of selection has been the establishment of progenies of outstanding trees with subsequent dispersion of selected material.

## Vernacular Names

Several names are now in common use for *Inga*. The Brazilian word *inga*, recorded first by Marcgravius and later applied to the genus by Plumier and Scopoli, is still of wide use in Brazil in an inclusive sense, followed by an adjective for specific determination, e.g. *inga cipó* (*I. edulis*), *inga peua* (*I. ruiziana*), etc. Another South American name is *pacay* or *pacae*, probably of Peruvian origin but now extending to Uruguay, as *pacay de los bañados (I. uraguensis)*.

In Central America, the Antilles, and northern South America (Colombia, Venezuela) the name *guamo* or *guabo* is generally used. This word seems to have originated in the Caribbean, perhaps in Hispaniola, and it is doubtful whether its spread was pre- or post-Columbian. From the north comes the name *cuajiniquil* (in Nahuatl, "the tree with pendant pods"), which is used with various modifications from Veracruz to Costa Rica.

Within the area where the last two names are used there are local ones of restricted interest. Most of them come from Indian dialects, but some have a common use at present such as *pepeto, chalun,* and *paterno* in Guatemala and EI Salvador, *chalauitl* in Mexico, etc. The name *bribri* is used in two widely separated areas: the lagoon of Chiriquí, in Panama, and the coastal zone of British Honduras. In some parts of Mexico (Sinaloa, Michoacán) the Spanish name *vainillo* is applied to some species of *Inga*. In the Lesser Antilles and Haiti they are generally called by the French name *pois-doux*, while in the British islands, "Spanish oak," recorded by Plukenet in 1641, is reserved for *I. fagifolia*.

## Infrageneric Categories

The current division of *Inga* into sections and series was first established by Bentham (in Hook., Lond. Jour. Bot. **4:** 577-621, 1845) and with minor changes maintained in his later publications (Trans. Linn. Soc. **30:** 335-664, 1875; in Mart., Fl. Bras. **15:** 458-500, 1876). From the very beginning Bentham had a broad understanding of the genus and the grouping he established seems, even now, to have a certain natural basis. However, many species were put in the wrong group, which tends to obscure the natural limits of sections and series. The delimitation of series by Bentham is difficult to follow in the keys, since they are based on highly variable and overlapping characters. In 1929 Pittier tried to redefine them, with not much success, and also created two new series for § INGA based on the structure of the legumes.

In the present treatment the categories established by Bentham are followed in large part, although some modifications are introduced. His five sections, LEPTINGA, DIADEMA, BOURGONIA, PSEUDINGA and EUINGA, are reduced to three: LEPTINGA, BOURGONIA and INGA. The first of these includes the species with globose inflorescences, divided by Bentham between LEPTINGA, if the flowers were pedicellate, and DIADEMA, if sessile. The fact that the length of the pedicel is a highly variable character, even on the same specimen, is the reason for abandoning this separation. There also is no important difference between sections PSEUDINGA and INGA;

Bentham and Pittier very often placed a species in either section depending upon the adequacy of material available (see *I. sapindoides*).

Section BOURGONIA is the most natural group among those established by Bentham and is the one that has suffered fewest transfers. On the basis of morphology alone it seems to be a rather primitive group evidently related to *Pithecellobium*. The species here are clearly defined in Central America and the West Indies, but in southern Brazil and Paraguay wide variability has been observed. The small and almost glabrous flowers with campanulate calyx are arranged in long, loose spikes, as in *I. fagifolia*, or on congested and short rhachises, as in *I. pezizifera*. The group has wide distribution, and Central America offers only two endemics: *I. longispica*, allied to the *I. coruscans* complex, more developed in Colombia than elsewhere, and the dubious *I. belicensis*, related to *I. fagifolia*, although several important characters maintain its individuality.

No clear relations can be established between § BOURGONIA and the other two sections. This is not extraordinary within the tropical *Leguminosae*, where genera are established by uniting groups of morphologically allied species of suspected polyphyletic origin.

Section INGA are a vast assemblage of intergrading groups of species held together by the possession of well developed, more or less pubescent flowers. In a total evaluation of the genus this section may acquire a subgeneric status and probably the present series could be considered as sections. As will be seen under TAXONOMY, the present treatment offers a redefinition of the series of Bentham and Pittier. The ser. GYMNOPODAE and PILOSIUSCULAE have been split in the present treatment into smaller and more natural units. The former were a vast assemblage of very different groups of species held together and differentiated by one character, the presence or absence of wings on the rhachis. As mentioned before, this is a very unstable character even in the same individual. The new series, although established in the area under study on a fraction of the total number of species, are all of them well represented in South America. The series PUNCTATAE seems to have some relation with § BOURGONIA, while the ser. PILOSULAE form a transition to the large flowered species of the subsequent series. The ser. CALOCEPHALAE of Bentham and Pittier have been divided into four independent series, one of them restricted to Central America. At the same time a revaluation of ser. TETRAGONAE has been necessary; this series, created by Pittier, includes in the present treatment some species ascribed previously to the ser. CALOCEPHALAE. By faulty correlation of legume and flower character, the same species might be classified by Bentham or by Pittier as one of the § PSEUDINGA-ser. CALOCEPHALAE if the specimen were in flower, or one of the § EUINGA-ser. TETRAGONAE if it were in fruit. The use of the latter name is maintained and the ser. CALOCEPHALAE are restricted to a South American group centered around *I. macrophylla* and *I. fastuosa* and represented in Central America only by *I. mucuna* and in the West Indies by *I. venosa*, endemic to Trinidad.

Section LEPTINGA is represented in Central America by nine species, one of which also occurs in Trinidad; in the rest of the West Indies there is none. This section is an assemblage of morphologically different species held together by one

common character, the spherical or clavate structure of the floral receptacle, giving an umbellate or globose appearance to the inflorescence. As mentioned before, this floral arrangement is probably the result of a contraction of the spikes or racemes and may be reached independently in different groups of species. This is corroborated by the trend, observed in some species of the ser. PILOSIUSCULAE, towards a condensation of the floral rhachis, as *I. venusta*, *I. hayesii* and especially the *I. acuminata* complex.

Of special interest in Central America is the presence of a group including *I. jinicuil*, *I. paterno* and *I. mortoniana*, without close affinities in neighboring areas but evidently related to the Amazonian *I. cinnamomea*, *I. cordistipula*, etc. Two other species are noteworthy from the morphological standpoint: *I. saffordiana*, with a particular flower structure not found in any other species in the genus, and *I. portobellensis*, in which the size and shape of the floral parts produce the most outstanding inflorescence in *Inga;* this species has some distant allies in South America (*e.g. I. inflata* Ducke.)

Section LEPTINGA is considered, then, more as a horizontal polyphyletic stage than as a group of naturally related species having a common origin. This is true of the section as a whole, but evidently within it clusters of species with strong natural affinity may be discerned. With the exception of the one about *I. jinicuil* no other complex occurs in the area in study. The other species in the section have close affinities in South America.

## SPECIATION

In the delimitation of species in this genus, one is confronted with the situation that some are clearly defined entities, while in others the overlapping of taxonomic characters make an acceptable definition almost impossible. Among the first group, *I. fagifolia*, *I. punctata*, *I. thibaudiana*, and a few others present a minimal variability in spite of their large areas of distribution. The reverse is true, especially in the ser. INGA and PILOSIUSCULAE, where species are formed by clusters of populations, each with a certain morphological type but clearly intergrading towards other intraspecific groups. In the past, it has been common to give these variants specific rank, but as more material becomes available, it has been possible to fill the intergrading spaces. In some cases the group variation has a clear distribution pattern and shows marked clines, but in others the aberrant characters appear with no geographic correlation, scattered throughout the whole range of distribution. Thus the variant called *I. fissicalyx* Pittier, with elongate stipules, sepals and leaves, occurs among otherwise typical populations of *I. vera* in widely separated parts of Mexico and Costa Rica.

Of the dilemma of raising to specific level all the possible variants and increasing the names *ad infinitum*, or considering them as minor variants within a species, the second has been preferred for this study. Some of the most important groups of variants are discussed as infraspecific entities without attempting any nomenclatorial definition.

The factors that have produced the striking variability in *Inga* are unknown. It has been suggested that hybridization is important, and this is possibly true in the

species cultivated as shade trees where different populations are planted together and then reproduced by mixed progenies. On the other hand, there are some factors that operate in reducing the effectiveness of hybridization, such as the type of pollination, seasonal isolation, and in natural populations the restricted dispersal.

Climatic and edaphic factors may have contributed considerably to the formation of infraspecific groups. Species such as *I. oerstediana*, which grows from sea level to almost 2,000 m elevation in Colombia and Central America, show such different types between the coastal and mountain populations that these have received different common names. However, they have many characters in common and the intergrading phases occur in the intermediate areas.

Geographical isolation in terms of geological periods is also very important. In *I. vera*, for example, the populations in the greater Antilles have been isolated from the bulk of the species probably since the late Miocene and offer quite a number of separating characters. The same occurs in the semi-arid areas of northern and central Mexico, where this species clearly shows subspecific differentiation.

There is no information on mutation patterns in *Inga*. However, observation of large populations, such as are found in coffee fields, reveals a remarkable polymorphism which is difficult to attribute to segregation alone. The accompanying illustration of three types of leaves of *I. edulis* shows a common pattern of variation (Fig. 1).

The human factor has been very important in speciation. Types cultivated

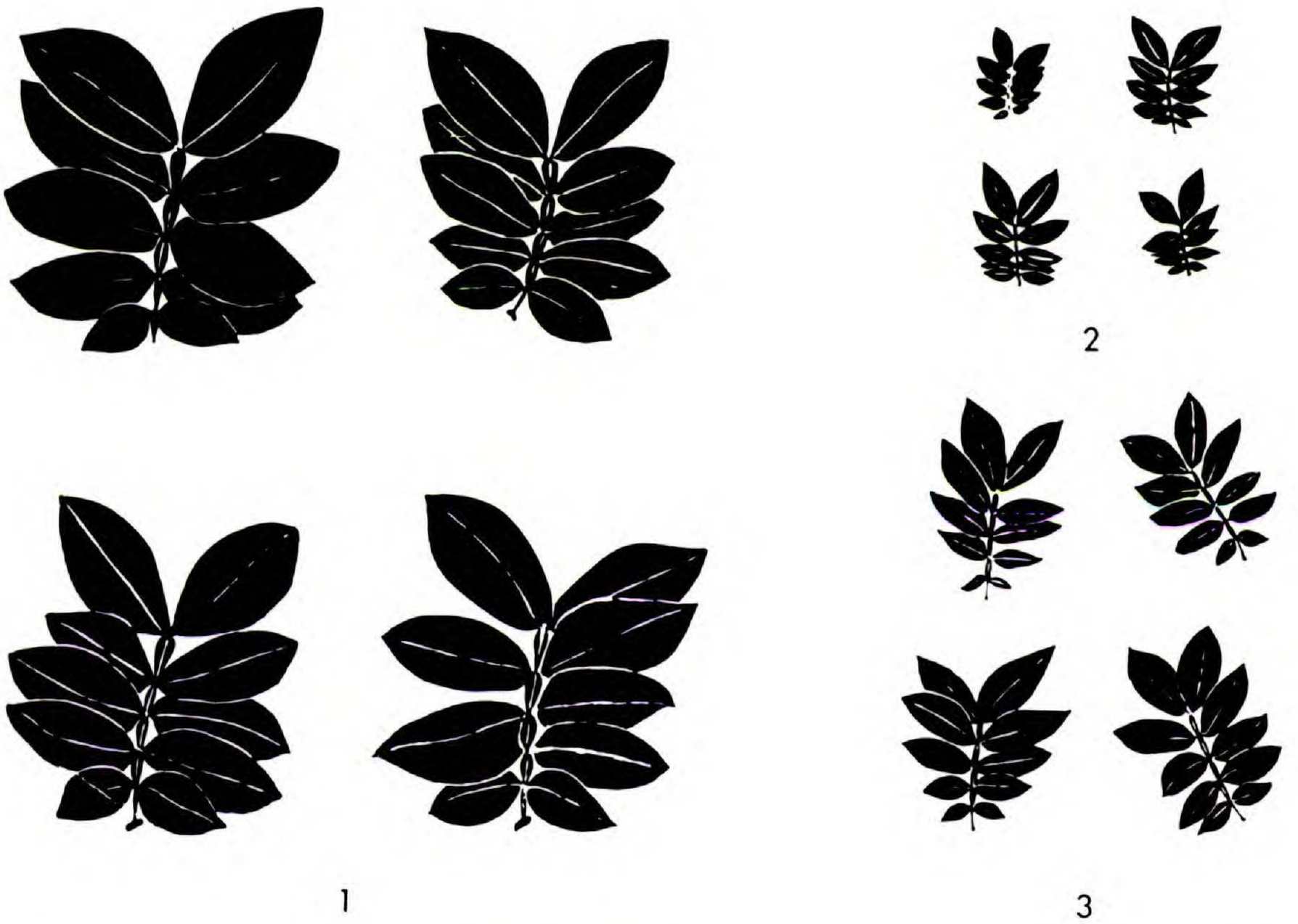



Fig. 1. Variation in a population of *Inga edulis* Mart.; representative leaves of three trees grown for shade in the same coffee grove. × 4.

as fruit trees or for shade have been selected, introduced into new areas, and may have contributed to the formation of new variants through hybridization.

Endemism is particularly important in four areas: the highlands of Mexico, the mountains of Costa Rica and the coastal lowlands of Panama; another center in the Lesser Antilles occupies the oldest section of the volcanic arch, from Martinique to Dominica. The endemics of Costa Rica, Panama, and the Caribbean islands show more affinities with South American species, while in the Mexican endemics this relationship is less marked. No one of the four centers already mentioned could be compared in number and variability of species with the Amazon basin or the Colombian cordilleras.

## Study Material

For the preparation of this study materials of the following herbaria were consulted: B, CR, EAP, F, GH, IAIAS, ILL, K, MO, NY, RB, US and VEN. I wish to acknowledge my indebtedness to the curators of the herbaria mentioned, and particularly to the Director and Staff of the Missouri Botanical Garden, where this work was completed.

## Taxonomy

Inga [Plum.] Scop., Introd. Hist. Nat. 298, 1777; Willd. in L., Sp. Pl. **4:** 1012, 1806; DC., Prodr. **2:** 432, 1825; Benth. in Hook., Lond. Jour. Bot. **4:** 577, 1845; Benth., Trans. Linn. Soc. **30:** 601, 1875; Pittier, Contr. U. S. Nat. Herb. **18:** 173, 1916; Pittier, Jour. Dept. Agr. Porto Rico **13:** 117, 1929.

*Amosa* Neck., Elem. **2:** 459, 1790.
*Torealia* Nor., Verh. Batay. Gen. **5,** Art. IV. 4, 1790.
*Ingaria* Raf., Sylva Tell. 119, 1838.
*Feuilleea* O. Ktze., Rev. Gen. Pl. **1:** 182, 1891 (pro parte).

*Trees*; branchlets glabrous or pubescent, lenticellate in age. *Leaves* alternate, once-pinnate; leaflets opposite, in 2 to many pairs, the terminal largest, the petiolules very short; rhachis terete or winged, ending in a linear, caducous appendage, the nectarial glands always present at the insertion of the leaflets; petiole terete or winged, with a clearly marked pulvinus; stipules small to large, generally caducous. *Inflorescences* axillary or terminal, 1 to ∞, fasciculate or paniculate; peduncle elongate to obsolete; rhachis elongate to condensed in a spheric or clavate structure, the bracts small or large, caducous or persistent. *Flowers* sessile to pedicellate, regular, white or yellow; calyx minute to very large, campanulate to tubular, synsepalous, the 5 segments regular or unequal, valvate in bud; corolla tubular to funnelform, sympetalous, 5-lobed, usually appressed-pilose; stamens numerous, the filaments united below, free above, included or exserted, the anthers eglandular, the pollen in massulae; gynoecium 1-carpellate, the ovary elongate, glabrous or pubescent, the style generally longer than the filaments, the stigma simple or lobed. *Legume* flat, quadragonal, or subterete, the margins narrower or wider than the valves, irregularly dehiscent; seeds oblong, covered by a loose, succulent aril, the cotyledons coriaceous.

Type species: *Inga vera* Willd.

KEY TO THE SECTIONS (I-III) AND SERIES (1-13)

a. Inflorescence racemose.

b. Calyx minute, less than 2 mm long, glabrous or very sparsely pubescent; legume flat, glabrous ..... I. BOURGONIA (p. 281)

bb. Calyx well developed, more than 2 mm long, pubescent or glabrate; legume flat, tetragonal or subterete ..... II. INGA (p. 289)

c. Legume flat with narrow margins, or tetragonal with the margins and valvular sides more or less equally broad.

d. Corolla less than 15 mm long (except in *I. multijuga* and *I. skutchii*), always less than 3 mm wide.

e. Calyx regular, the teeth of the same size (except in *I. skutchii* and *I. pinetorum*).

f. Calyx pilose to glabrescent; rhachis winged, marginate or terete; glands patelliform; bracts short and broad.

g. Leaflets 2-4 pairs; rhachis terete ..... 1. PUNCTATAE (p. 289)

gg. Leaflets 4-10 pairs; rhachis winged, terete or marginate.

h. Leaflets 5-8 pairs; rhachis terete; corolla more than 10 mm long (except in *I. ruiziana* ..... 2. MULTIJUGAE (p. 297)

hh. Leaflets 5 or less pairs; rhachis winged or marginate; corolla less than 10 mm long ..... 3. DENSIFLORAE (p. 302)

ff. Calyx setose, the teeth subulate; rhachis winged; glands stipitate; bracts narrow, lanceolate ..... 4. LEPTANTHAE (p. 312)

ee. Calyx markedly cleft on 1 or 2 sides

i. Flowers small, corolla less than 12 mm long, congested in a very short spike; plant glabrous ..... 5. ACUMINATAE (p. 313)

ii. Flowers relatively large, corolla more than 12 mm long, in loose spikes; leaves and flowers yellow-pilose ..... 6. PILOSULAE (p. 314)

dd. Corolla more than 15 mm long, or if less, then more than 3 mm wide

j. Calyx more than 15 mm long; legume densely ferrugineous-pubescent.

k. Calyx narrow, less than 5 mm wide, more than 17 mm long ..... 7. CALOCEPHALAE (p. 317)

kk. Calyx broad, 8-12 mm wide, less than 17 mm long ..... 8. GOLDMANIANAE (p. 319)

jj. Calyx less than 15 mm long.

l. Calyx cupular, densely lanose; rhachis terete (in the Central American species) or winged; flowers distant, often pedicellate; bracts caducous ..... 9. DYSANTHAE (p. 320)

ll. Calyx tubular, pilose or glabrescent; rhachis generally winged; flowers congested; bracts persistent or subpersistent.
m. Legume flat.
n. Leaves and branchlets glabrous or sparsely pilose; glands short, patelliform; legume thick, 30-70 cm long ..... 10. SPECTABILES (p. 322)
nn. Leaves and branchlets densely yellow or ferrugineous-pilose, in age glabrous; glands thin, long-stipitate; legume thin, less than 30 cm long ..... 11. VULPINAE (p. 323)
mm. Legume tetragonal ..... 12. TETRAGONAE (p. 324)
cc. Legume subterete, the valvular sides reduced and narrower than the margins, sulcate ..... 13. INGA (p. 328)
aa. Inflorescence capituliform or umbelliform; flowers small, glabrous or tomentose, legume flat ..... III. § LEPTINGA (p. 344)

SECTION I. BOURGONIA Benth. in Hook., Lond. Jour. Bot. **4:** 585, 1845 (as *Burgonia*).

*Flowers* minute, glabrous or sparsely pubescent, sessile or very shortly pedicellate, in rather loose inflorescences; calyx campanulate, less than 2 mm long; corolla tubular-funnelform, 3-4 times longer than the calyx. *Inflorescences* with peduncle shorter or longer than the rhachis, in the first case as long cylindric spikes, in the latter as ovoid to oblong spikes or racemes. *Legume* flat, glabrous, with prominent margins. Leaves glabrous or very sparsely pubescent, the lateral nerves distant, the rhachis terete, marginate or narrowly winged. *Trees* with dense crown and rather shallow root system. SPECIES . . . 1-6.

a. Floral rhachis longer than the peduncle; inflorescence cylindric, lax, 4-8 cm long.
b. Foliar rhachis winged or marginate ..... 1. I. MARGINATA
bb. Foliar rhachis not winged, sometimes scarcely marginate.
c. Spikes about 17 cm long. Costa Rica ..... 2. I. LONGISPICA
cc. Spikes less than 15 cm long.
d. Leaflets generally in 2-3 pairs, the upper pair less than 16 cm long; stipules minute. Mexico to Panama ..... 3. I. FAGIFOLIA
dd. Leaflets in 3 pairs, the upper pair more than 16 cm long; stipules conspicuous. Panama ..... 4. I. CORUSCANS
aa. Floral rhachis shorter than the peduncle; inflorescence conic, congested, 1-2 cm long.
e. Foliar rhachis winged or marginate; upper leaflets less than 12 cm long. British Honduras ..... 5. I. BELICENSIS
ee. Foliar rhachis terete; upper leaflets more than 15 cm long. Panama ..... 6. I. PEZIZIFERA

1. INGA MARGINATA Willd. in L., Sp. Pl. **4:** 1015, 1806. (Type *Bredemeyer s.n.* photo)

*Inga sapida* H.B.K., Nov. Gen. Sp. Pl. **6:** 286, 1824, non Benth. (ex char.; Type *Humboldt & Bonpland s.n.*, not seen)
*Mimosa semialata* Vell., Fl. Flum. 11: *t.* 5, 1835. (ex ic.)

*Inga guayaquilensis* G. Don, Gen. Hist. Dichl. Pl. **2:** 391, 1832 (*fide* Bentham). (Type *Ruiz & Pavon s.n.*, not seen)
*I. odorata* G. Don, loc. cit. 388 (*fide* Bentham). (Type *Ruiz & Pavon s.n.*, not seen)
*I. semialata* (Vell.) Mart., Flora **20,** Bd. 2 Beibl. 111, 1837.
*I. excelsa* Poeppig, Nov. Gen. Sp. Pl. **3:** 78, 1845 (*fide* Bentham). (Type *Poeppig s.n.*, not seen)
*I. puberula* Benth. in Hook., Lond. Jour. Bot. **4:** 589, 1845 (*fide* Bentham). (Type *Pohl s.n.*, not seen)
*I. pycnostachya* Benth., loc. cit. (Type *Matthews s.n.*, not seen)
*Feuilleea marginata* (Willd.) O. Ktze., Rev. Gen. Pl. **1:** 188, 1891.

*Trees* up to 20 m tall, the crown dense and spreading; branchlets terete, glabrous, lenticellate. *Leaves* with 2 pairs of leaflets; leaflets elliptic to falciform, acute to long-acuminate at the apex, the base acute and strongly asymmetric, above dark green, lustrous, glabrous to sparsely pilose, the 4-6 pairs of lateral nerves distant and prominent, beneath glabrous, the nerves prominent, the upper pair narrowly elliptic to falciform, 7-14 cm long, 2.5-5.0 cm wide, the lower pair elliptic, 4-9 cm long, 1.5-4.0 cm wide; the petiolules up to 3 mm long, densely pilose; rhachis cuneately winged to marginate, 2-4 cm long, glabrous, the glands patelliform, less than 1.5 mm wide; petiole winged or marginate, 1.0-2.5 cm long, the pulvinus terete and dark, about 0.5 cm long, minutely pilose; stipules lanceolate, up to 5 mm long, striate, pubescent, caducous. *Inflorescences* 1-4, axillary; peduncle terete, 0.5-3.0 cm long, densely pubescent to glabrous; rhachis 4-11 cm long, the bracts linear, 2 mm long, persistent. *Flowers* distant or congested, sessile to pedicellate, the pedicels up to 3 mm long; calyx minute, campanulate, about 1 mm long, pilose at the base, glabrescent above, the teeth acute and more pubescent; corolla 3 mm long, narrowly tubular in the lower third, funnelform above, glabrous below, the lobes short, pilose; staminal tube exserted. *Legume* flat, oblong, deeply constricted between the seeds, up to 14 cm long and 1.5 cm wide, glabrous.

Common in the wet forests at below 800 m elevation. Costa Rica and Panama. (Widely distributed in South America, extending to Brazil and Bolivia.)

Vernacular name: *cuajiniquil negro* (Costa Rica).

COSTA RICA: ALAJUELA: La Tigra, San Carlos, *Barquero 14* (IAIAS, MO); Pata de Gallo, San Ramón, *Brenes 6589* (F), *Brenes 6646* (F), Santiago de San Ramón, *Brenes 6689* (F). CARTAGO: Atirro, *J. D. Smith 6493* (GH, NY, US); Las Vueltas, Tucurrique, *Tonduz 12744* (CR); Tuis, *Tonduz 11349* (NY, US); Turrialba, *Gregory 1881* (IAIAS), *Holdridge 2475* (IAIAS), *de Wolf 175* (IAIAS), GUANACASTE: Laguna Arenal, *Brenes 12657* (F); Naranjos Agrios, *Standley & Valerio 46387* (F, US); Nicoya, *M. Valerio 501* (CR, F); Quebrada Serena, *Standley & Valerio 46077* (F, US); Tilarán, *J. Valerio 51* (US). HEREDIA: Puente de Mulas, *Echeverría 347* (CR, F), *Sáenz 61* (CR, F). LIMON: Jiménez, *J. J. Cooper 10198* (US); Montecristo, *Standley & Valerio 48645* (F); Sipurio, *Tonduz 8710* (CR, F, GH, US); Siquirres, *Lankester 948* (US). PUNTARENAS: Buenos Aires, *Tonduz 6690* (F, US); Golfito, *Allen 6242* (EAP). SAN JOSE: Aserrí, *León 3838* (IAIAS, MO); El General, *Skutch 4111* (MO, NY, US), *Skutch 4288* (MO, NY).

PANAMA: BOCAS DEL TORO: Almirante, Daytonia Farm, *Cooper 546* (F); Changuinola Valley, *Dunlap 282* (US), *Seibert 1582* (MO); Chiriqui Lagoon, *von Wedel 1378* (GH, MO, US); Water Valley, Chiriqui Lagoon, *von Wedel 1549* (GH), *1807* (GH, MO, US). CANAL ZONE: Barro Colorado Island, *Bangham 535* (F), *Shattuck 516* (F), *Standley 40996* (US), *Woodworth & Vestal 610* (F), *Zetek 3824* (F), *4322* (F); Gatún, *Pittier 6512* (GH, NY, US); without locality, *Hayes 950* (NY). COCLE: Valle de Antón, *Allen 2231* (F, MO, US). DARIEN: Sambú River, *Pittier 5579* (US).

The Central American material of *I. marginata* shows very slight variability; all the leaves are bijugate, with one exception, and offer a remarkable similarity in shape and structure; the indument varies from none to a short and dense pubescence on the costa and main nerves. In contrast the variability in South America is very high, especially in Brazil and Paraguay. Its relation to *I. cylindrica* (Vell.) Mart. is not clear and many of the published varieties also are of dubious standing.

In Central America *I. marginata* is commonly planted as a shade tree in the coffee fields, although the dense crown and the superficial root system hardly make it desirable.

2. INGA LONGISPICA Standley, Publ. Field Mus. Nat. Hist., Bot. Ser., **18:** 497, 1937. (Type *Brenes 6371*)

*Trees;* branchlets terete, striate, glabrous, densely lenticellate. *Leaves* with 3 pairs of leaflets; leaflets subcoriaceous, elliptic to lanceolate-oblong, the apex acuminate, the acumen 0.5-1.0 cm long, mucronate, the base acute, decurrent, above dark green, lustrous, glabrous except for a sparse pilosity on the costa, punctate, the 6-8 pairs of lateral nerves slightly prominent or sunken, beneath paler, glabrous, the nerves prominent, the tertiary nervation conspicuous and finely reticulate, the upper pair elliptic, oblique, 6-11 cm long, 2-4 cm wide, the medium and lower pairs lanceolate-elliptic, the lowermost 3-5 cm long, 1.0-2.5 cm wide, the petiolules 1-2 mm long, pilose; rhachis terete, caniculate above, 4-6 cm long, sparsely pilose, the glands small, stipitate, pertuse; petiole terete, 1.0-1.5 cm long, glabrous, the pulvinus about one third of the length, darker and thicker. *Inflorescences* axillary, often at the defoliated nodes; peduncle 3-6 cm long, striate, papillose; rhachis 8-13 cm long, the bracts minute, deciduous. *Flowers* distant, sessile; calyx campanulate, about 2 mm long, sparsely pilose, the teeth obtuse; corolla tubular-funnelform, 5-6 mm long, sparsely pilose, the lobes acute, about 2 mm long, sometimes retroflexed; staminal tube included, the filaments 1.5-2.0 cm long. *Legume* unknown.

Wet forests of central Costa Rica, at 1000-1200 m elevation.

COSTA RICA: ALAJUELA: La Palma, San Ramón, *Brenes 6371* (CR, F, IAIAS); Vara Blanca, *Skutch 3705* (MO, NY, US). SAN JOSE: La Palma de Coronado, *Holdridge 5948* (IAIAS).

An isolated species remarkable for the long spikes and short, sessile flowers. It seems related to *I. coruscans* H.B.K. in the general habit, differing however in the structure of the inflorescence and the size and shape of the leaflets.

3. INGA FAGIFOLIA (L.) Willd. ex Benth., Trans. Linn. Soc. **30:** 607, 1875.—Fig. 2.

*Mimosa fagifolia* L., Sp. Pl. 516, 1753 (Based on Pluk., Alm. *t. 241, fig 21*), non Jacq. (1763).
*M. laurina* Sw., Prodr. 85, 1788. (ex char.) (Type *Masson s.n.*, not seen)
*Inga laurina* (Sw.) Willd. in L., Sp. Pl. **4:** 1018, 1806.
*Mimosa tetraphylla* Vell., Fl. Flum. **11:** *t. 8*, 1827. (ex ic.)
*Inga tetraphylla* (Vell.) Mart., Flora **20:** Beibl. 112, 1837.
*Feuilleea laurina* (Sw.) O. Ktze., Rev. Gen. Pl. **1:** 184, 1891.
*F. fagifolia* (L.) O. Ktze., loc. cit. 187.

*Trees* with dense crown; branchlets terete, gray or whitish, glabrous, striate, lenticellate. *Leaves* relatively small, with 2-3 pairs of leaflets; leaflets coriaceous, obovate to narrowly elliptic, often very asymmetric, rounded, broadly acuminate or retuse at the apex, the base acute, unequal, above deep green, lustrous, glabrous, with 5-7 pairs of prominent nerves, the reticulate nervation conspicuous, beneath paler, glabrous, the nerves prominent, the upper pair elliptic to obovate, 4-16 cm long, 2-6 cm wide, the lower pair 3-9 cm long, 1-4 cm wide; rhachis terete or

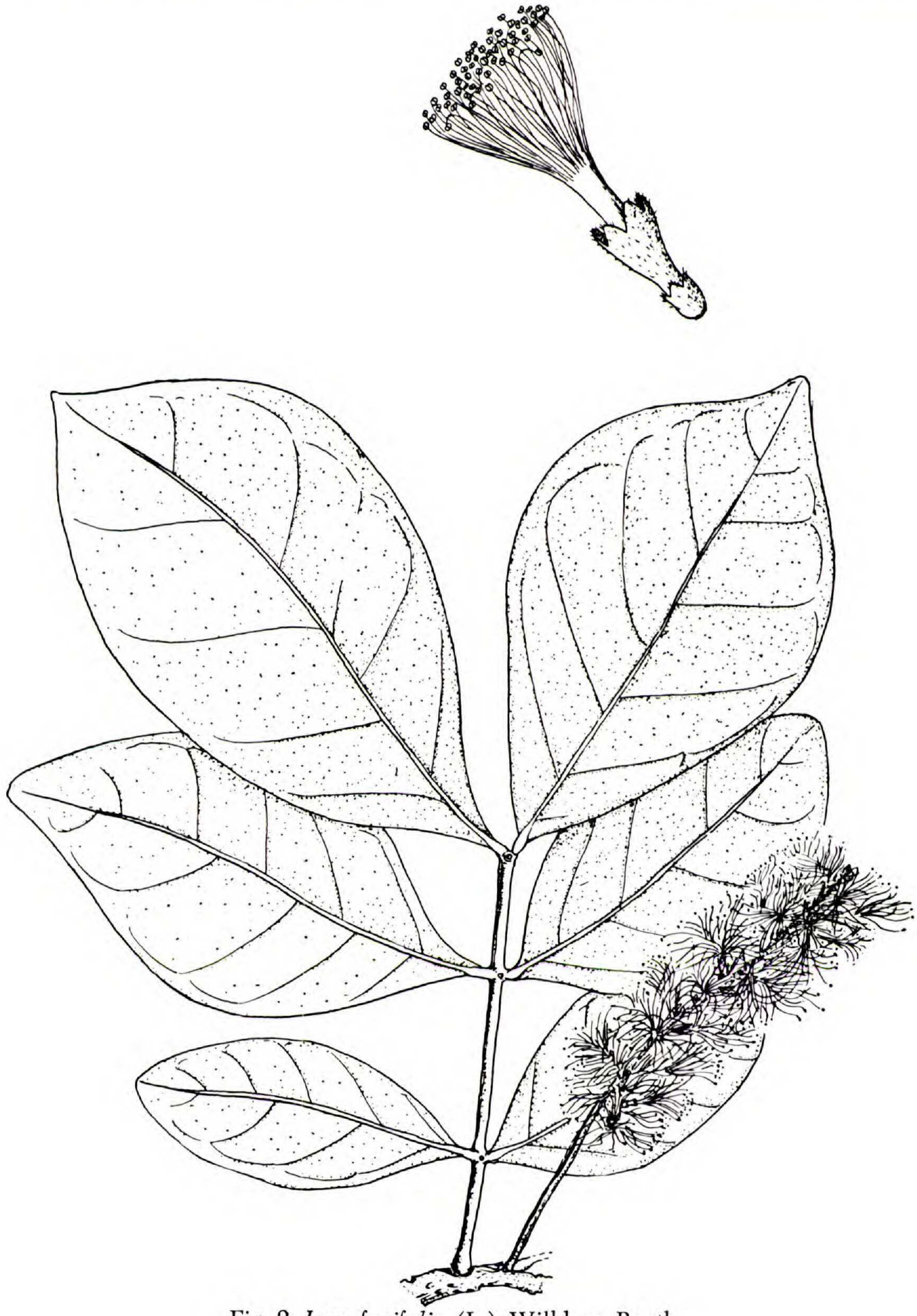


Fig. 2. *Inga fagifolia* (L.) Willd. ex Benth.

marginate, with a groove in the upper side, 2-6 cm long, glabrous or sparsely pilose, the glands patelliform, short-stipitate, less than 1 mm in diam; petiole terete, 1.0-2.5 cm long, sulcate above, minutely pubescent to glabrous, the pulvinus thick and dark; stipules oblong, up to 7 mm long, 4 mm wide, glabrous or pubescent at the round apex, thick and persistent. *Inflorescences* axillary, 1-5 spikes in the same axil, congested in the terminal branchlets; peduncle terete, 1-4 cm long, striate, glabrous or sparsely pilose; rhachis angulate, 3-11 cm long, glabrous or rarely sparsely pilose. *Flowers* sessile, in rather loose spikes; calyx tubular, 1-2 mm long, striate, glabrous or sparsely pilose, the teeth shallow, pubescent at the tips; corolla funnelform, the throat about half the total length, 3-6 mm long, glabrous or sparsely pilose, the lobes acute, not spreading, about 1 mm long, pubescent at the apex; staminal tube included to long-exserted, the filaments up to 12 mm long. *Legume* flat, oblong, 10-30 cm long, 2-5 cm wide, transversely striate, glabrous, the borders not markedly elevated.

Wet to semi-dry forests, or highland savannas. Mexico to Panama; Haiti to Trinidad. (South America.)

Vernacular names: *caspiro, nacaspiro* (Guatemala-Standley); *paternillo* (El Salvador-Calderón); *jina* (Dominican Republic-Valeur); "*Spanish oak*" (Lesser Antilles).

MEXICO: CHIAPAS: Escuintla, *Matuda 46* (MO, NY, US), *1862* (F, K, US). GUERRERO: Acapulco, *Palmer 584* (F, GH, K, MO, NY, US). JALISCO: Hacienda San Marcos, *Pringle 5494* (GH). NAYARIT: Ixtapa, *Nelson 4149* (US); Tepic, *González Ortega 43* (US). OAXACA: Tuxtepec, Chiltepec, *Martínez-Calderón 171* (US).

GUATEMALA: ALTA VERAPAZ: Sepacuité, *Cook & Griggs 760* (US), *761* (US). ESCUINTLA: Escuintla, *J. D. Smith 2825* (US), *Hayes s.n.* (GH); *Rio Burrión,* NE of Escuintla, *Standley 89578* (F, US); without locality, *Aguilar 1685* (F). IZABEL: Quiriguá, *Standley 24253* (US). RETALHULEU: Retalhuleu, *Standley 88829* (F); Retalhuleu to Asintal, *Standley 87808* (F); Nueva Linda, *Standley 87254* (F), *87304* (F). SUCHITEPEQUEZ: Mazatenango, Las Animas, *Maxon & Hay 3451* (NY, US).

EL SALVADOR: AHUACHAPAN: Ahuachapán, *Standley & Padilla 2836* (F). LA PAZ: Zacatecoluca, *Calderón 293* (GH, NY, US). SAN SALVADOR: Tonacotepeque, *Calderón 215* (GH, NY, US), *Standley 19450* (GH, NY, US). SAN VICENTE: San Vicente, *Standley 21744* (F, GH, MO, NY, US). SONSONATE: Juayúa, *Pittier 1990* (US).

NICARAGUA: ZELAYA: El Recreo, *Standley 19812* (F).

COSTA RICA: CARTAGO: Las Vueltas, Tucurrique, *Tonduz 12991* (US), *León 3001* (IAIAS).

PANAMA: CANAL ZONE: Barro Colorado Island, *Bangham 547* (F), *M. Brown 65* (F), *Shattuck 797* (F), *Wettmore & Abbe 129* (F, GH), *Zetek 4356* (F). CHIRIQUI: Boca Chica, Horconcitos, *Pittier 5119* (GH, NY, US), *Seemann 1689* (GH). COCLE: Penonomé, *R. S. Williams 532* (NY, US). HERRERA: Ocú, *Allen 4037* (F, MO). PANAMA: Capira, *Allen 1688* (GH, NY, US); El Cermeño, *Zetek 4403* (F, MO, NY); Río Pacora, *Allen 817* (F, GH, MO, US); Río Tapia, *Standley 30673* (US).

HAITI: SUD: Carbajel to Bois-Charles, *Ekman 6063* (US); Morne Baymond, *Christ 2092* (US).

DOMINICAN REPUBLIC: ALTA GRACIA: Higüey, *Taylor 417* (NY). DUARTE: San Francisco de Macorís, *Abbot 2212* (US). LA VEGA: Contanza, *Tuerckheim 3300* (F, GH, MO, NY, US). MACORIS: Consuelo, *Taylor 326* (F, NY). MONTE CRISTI: Monción, *Mera (Herb. Jim. 2089)* (US), *Valeur 716* (F, MO, NY, US). PACIFICADOR: Pimentel, *Abbot 636* (US). SAMANA: Samaná, *Muller s.n.* (US); Sánchez, *Abbot 2733* (US). SEIBO: Azui, *Taylor 291* (F, NY). WITHOUT LOCALITY: *Scarff 18a* (F), *Wright, Parry & Brummel 75* (GH, US), 86 (F).

PUERTO RICO: AGUADILLA: Maricao, *Otero & Alvarez 550* (F, MO). ARECIBO: Utuado, *Sargent 109* (US), *Sintenis 6504* (F, GH, MO, NY, US). MAYAGUEZ: Cabo Rojo, *Sintenis*

*724* (GH, US); Las Mesas, *Holm 271* (GH); Mayagüez, *Britton & Marble 589* (US), *Cowell 555* (NY), *Heller 4376* (F, MO, NY), *Miller 1635* (US); Sabana Grande, *Sargent 464* (US); San Sebastián, *Sargent 228* (US). GUAYAMA: Barranquitas, *Britton & Britton 8827* (NY, US); Caguas, *Heller 925* (F, NY, US); Sierra de Naguabo, *Shafer 3198* (NY, US). HUMACAO: Sierra de Yabucoa, *Sintenis 2607* (US). PONCE: Coamo, El Tendal, *Britton, Britton & Brown 6022* (NY); Coamo Springs, *Underwood & Griggs 514* (NY, US); Ponce, *Britton & Shafer 1741* (NY, US); Ponce to Coamo, *Heller 508* (F, NY, US). SAN JUAN: Bayamón, *Stahl 384* (US); Río Piedras, *Goll, Cook & Collins 302* (NY, US), *J. R. Johnston 581* (NY), *Bro. Hiram s. n.* (NY), *Stevenson 241* (US), *581* (US), *2467* (NY, US). VIEQUEZ ISLAND: Isabel Segunda, *Shafer 2490* (NY, US); without locality, *Blaner 186* (NY). PROVINCE UNKNOWN: Monte Torrecilla, *Britton, Cowell & Brown 5609* (NY). WITHOUT LOCALITY: *Kuntze 465* (NY), *Sessé, Mociño, etc. 3785* (F).

VIRGEN GORDA: Forests, *Fishlock 309* (NY).

TORTOLA: Town to High Bash, *Britton & Shafer 716* (F, NY, US).

ST. JUAN: Bordeaux, *Britton & Shafer 561* (NY, US).

ST. THOMAS: Signalhill, *Eggers s. n.* (US); St. Peter, *Britton & Marble 1226* (F, NY, US); without locality, *Eggers 264* (GH).

ST. CROIX: Mt. Eagle, *Thompson 429* (NY); without locality, *Bertero s. n.* (MO).

SABA: without locality, *Bolding 1578* (NY).

ST. KITTS: Wingfield Estate, *Britton & Cowell 484* (NY, US).

ANTIGUA: Donning Valley, *Box 1031* (US); without locality, *Rose, Fitch & Russell 3457* (F, GH, MO, NY, US).

MONTSERRAT: Soufrière, *Shafer 587* (F, NY, US).

GUADELOUPE: Bailliff, *Stehlé 280* (US); Ile de Saints, *Stehlé 92* (NY); Point-a-Pitre, *Stehlé 237* (NY); without locality, *Questel 2637* (US), *Duss 2633* (NY, US).

DOMINICA: Hampstead, *F. E. Lloyd 655* (NY); Lisdara Estate, *G. P. Cooper 185* (F, GH, NY, US); St. Acomant, *F. E. Lloyd 564* (NY); Sylvania Estate, *Hodge 611* (NY, US).

MARTINIQUE: Macouba, *Hahn 436* (GH); Parnasse, *Duss 1157* (NY, US); Rivière de la Case Pilote, *Hahn 1169* (US); Rivière Mme. Tivoli, *Stehlé 5690* (F, US); without locality, *Fairchild s. n.* (US), Sieber's *distr. Fl. Mart. 324* (GH, MO).

BARBADOS: Dodds, St. Philip, *Bot. Sta. Herb. Barbados 418* (F, GH, NY); without locality, *Waby 105* (F).

ST. VINCENT: Windsor Forest, *J. S. Beard 231* (MO); without locality, *Smith & Smith 677* (GH, NY), *1047* (NY), 1912 (GH).

GRENADA: Les Avocats, St. David's, *Broadway s. n.* (GH, MO, NY, US); Grand Etang, *Sterring 293* (US).

TRINIDAD: without locality, *Sieber 120* (GH, MO); *Trin. Bot. Gard. Herb. 1410* (US).

*Inga fagifolia* is one of the species with more ample geographic distribution within the genus, extending from Jalisco to southern Brazil. It is also one of the few species of *Inga* that do well in rather dry climates; its habitat, however, ranges from the dry scrublands in some Caribbean islands to the rain forest or the wet cloudy forests of the Central American highlands. A remarkable morphological variability, as expected, is found throughout the range: 1) From Mexico to Panama, 3-jugate leaved specimens predominate, as well as large fruits. 2) In the Antilles the species extends from Hispaniola to Trinidad, showing a recent relation between the continental bloc of the Greater Antilles and the volcanic islands of the Lesser Antilles; here the specimens show bijugate leaves, small and thick fruits, but in other vegetative characters as well as in the flower structure they are much like the Central American plants.

Although the original name *M. fagifolia* was given to a West Indian plant (from Plukenet's *Almagestum* giving the locality as Barbados), *I. fagifolia* in recent times has been applied to the Brazilian plants, using the name *I. laurina* for the Central American and Antillean plants. After examining many specimens,

some of them mentioned by Bentham, it seems that the differential characters between the two, such as the length of the staminal tube, are so variable within the same specimens or in small areas (including some in Central America), that they do not justify a specific segregation.

4. INGA CORUSCANS Willd. in L., Sp. Pl. **4:** 1017, 1806. (Type *Bonpland s.n.* photo)
*Mimosa coruscans* (Willd.) Poir. in Lam., Encycl. Suppl. **1:** 43, 1810.
*Feuilleea coruscans* (Willd.) O. Ktze., Rev. Gen. Pl. **1:** 87, 1891.
*Inga caldasiana* Britton & Killip, Ann. N. Y. Acad. Sci. **35:** 115, 1936. (Type *Mutis* 3539)

*Trees* up to 20 m tall; branchlets terete, glabrous, lenticellate. *Leaves* with 3 pairs of leaflets; leaflets coriaceous or chartaceous, elliptic to lanceolate, the apex obtuse to broadly apiculate, the base acute or obtuse, above lustrous and glabrous, the 6-10 lateral nerves distant and impressed, with tertiary nervation conspicuous, beneath glabrous, the nerves markedly prominent, the upper pair elliptic to obovate, 15-17 cm long, 6-7 cm wide, the intermediate pair elliptic, 10-14 cm long, 3-6 cm wide, the basal pair oblong to lanceolate-oblong, about 9 cm long, 4 cm wide, the petiolules thick and dark, about 3 mm long; rhachis terete to slightly marginate, 6-10 cm long, glabrous, the glands patelliform, about 2 mm in diam; petiole terete, 1-2 cm long, glabrous, the pulvinus thick and striate, 0.5-1.0 cm long; stipules elliptic, up to 14 mm long and 2 mm wide, tomentose to glabrous, striate. *Inflorescences* axillary, 1-4 spikes in the defoliated axils or in short, stipulate branchlets; peduncle slender, 1.0-2.5 cm long, glabrous to puberulent; rhachis angulate, 1-2 cm long, the bracts spatulate, reflexed, about 1 mm long. *Flowers* sessile, congested; calyx campanulate, sparsely pilose, 1 mm long, the teeth small and irregular; corolla tubular-funnelform, 4-5 mm long, glabrous or puberulent at the tip, the lobes acute, 1 mm long; staminal tube slightly exserted; ovary oblong, compressed. *Legume* flat, oblong, straight, about 22 cm long, 2 cm wide.

Costa Rica, Panama. (Colombia.) Apparently a rare species, occurring at very different elevations.

COSTA RICA: PUNTARENAS: Río Esquinas, Kil. 42, *Allen* 5433 (F, MO).
PANAMA: DARIEN: Yaviza, *Allen* 4585 (F, MO).

The present interpretation of this species is based on the study of a photograph of the type and the detailed description of Kunth in H.B.K. (Nov. Gen. Sp. Pl. **6:** 284, 1823). Four collections from Colombia have been examined that match very well the photo and description; the same is true of the Panamanian specimen. It is quite probable that *I. lopadenia* Harms may belong here, as well as some Venezuelan specimens, thus giving more amplitude to the present geographic area.

5. INGA BELICENSIS Standley, Publ. Field Mus. Nat. Hist., Bot. Ser., **4:** 307, 1940. (Type *Schipp 24*)

*Trees* up to 17 m tall; branchlets terete, puberulent when young, in age glabrate. *Leaves* with 3 pairs of leaflets; leaflets coriaceous, obovate to elliptic, the apex acute to acuminate, the acumen curved, sometimes mucronate, 1.5 cm long,

the base cuneate, often oblique, above lustrous, glabrous, the nerves scarcely prominent, beneath dull, glabrous, the nerves conspicuous, the upper pair obovate to obovate-elliptic, 8-12 cm long, 2.5-4.5 cm wide, the lower pair elliptic and oblique, the basal pair 4-6 cm long, 1.5-2.5 cm wide, petiolules short, 1-2 mm long, pilose; rhachis narrowly winged to marginate, 3-7 cm long, glabrous, the glands stipitate, glabrous, pertuse; petiole terete, 0.5-1.0 cm long, glabrous, the pulvinus thick, one fourth the length of the petiole. *Inflorescences* 1-2 in each axil; peduncle terete, 1.5-3.5 cm long, puberulent, 3 times longer than the rhachis; rhachis 0.5-1.5 cm long, the bracts triangular, less than 1 mm long, pubescent, apparently persistent. *Flowers* sessile, in congested spikes; calyx campanulate, 1.5 mm long, glabrescent, the lobes acute, about 1.5 mm long, pilose; staminal tube exserted. *Legume* flat, oblong, 10-14 cm long, 2.0-2.5 cm wide, glabrous or pilose at the margins, the borders elevated.

Lowlands of British Honduras and adjacent Guatemala.

BRITISH HONDURAS: Baboon Ridge, Stann Creek District, *Gentle 3134* (NY); Mullins River Road, *Schipp 24* (F, MO); Saint Augustin, El Cayo District, *Lundell 6599* (F, GH, NY); Valentin, El Cayo, *Lundell 6325* (F).

GUATEMALA: IZABAL: Bananera to La Presa, *Steyermark 38158* (F).

*Inga belicensis* is a close ally of *I. fagifolia*. The latter is generally restricted in Central America to the Pacific slope, and it is very possible that the Belice plant represents a variant due to a long isolation. In foliage and fruit the two species practically are indistinguishable, but some minor variations in the shape of the leaflets do occur: for instance, the marked acumination in *I. belicensis*. There is also a trend in this species to have a wider rhachis. The most important differences are in the inflorescence: in *I. fagifolia* the peduncular part is always a fraction of the total axis, while in *I. belicensis* the floral rhachis is restricted to one third the length of the peduncle. The Guatemalan plant is referred here tentatively as it is a sterile specimen.

6. INGA PEZIZIFERA Benth. in Hook., Lond. Jour. Bot. **4:** 587, 1845. (Type *Schomburgk 124* photo)

*Feuilleea pezizifera* (Benth.) O. Ktze., Rev. Gen. Pl. **1:** 188, 1891.
*Inga microstachya* Britton & Killip, Ann. N. Y. Acad. Sci. **35:** 115, 1936. (Type *Mutis* 3633)

*Trees*; branchlets terete, glabrous, markedly pedicellate. *Leaves* with 3-5 pairs of leaflets; leaflets chartaceous, elliptic to lanceolate-elliptic, the apex markedly acuminate, the broad acumen up to 1 cm long, the base rounded to acute, strongly asymmetric, above lustrous, glabrous, the nerves prominent, the upper pair lanceolate-elliptic, 12-18 cm long, 4-7 cm wide, the lower pair lanceolate 7-9 cm long, 3-4 cm wide; the petiolules short, 2 mm long, glabrous; rhachis terete to angulate, generally broader and flattened in the upper part of each interfoliolar section, 7-15 cm long glabrous or puberulent, the glands prominent, crateriform, 2 mm in diam, glabrous; petiole terete, broad at the pulvinar section 1.5-2.0 cm long, glabrous or puberulent; stipules oval-lanceolate, 5-6 mm long, pilose, cadu-

cous. *Inflorescences* spicate, axillary, 1-5 per axil, frequently on defoliated branchlets of the previous growth; peduncle slender, 2.5-4.0 cm long, puberulent; rhachis 1.5-3.5 cm long, the bracts minute, spatulate, about 1.5 mm long; puberulent, semi-persistent. *Flowers* congested, sessile; calyx conic, 1.5-2.0 mm long; corolla tubular-funnelform, 5-6 mm long, sparsely puberulent, the lobes acute, about 1 mm long; staminal tube slightly exserted; ovary oblong, short, sparsely pilose. *Legume* unknown.

Panama. (Colombia to Brazil.)

PANAMA: CANAL ZONE: Barro Colorado Island, *Kenoyer* 363 (US), *Zetek* 3867 (F, MO); Chagres batteries to Fort San Lorenzo, *Maxon & Valentine 6979* (GH, US).

A species well marked for its fascicled inflorescences, of which there are up to five in each axil, and for its acute to narrowly acuminate leaflets. In many of its foliar characters it remotely resembles *I. ruiziana*, with which it is often confused in the herbaria; the shape of the leaflets, however, is very different in the two species. Some Brazilian specimens, such as *Ducke* 35538, labeled as *I. subsericantha* Ducke, also belong here.

## SECTION II. INGA

§ *Evinga* Benth. in Hook., Lond. Jour. Bot. **4**: 606, 1845.
§ *Pseudinga* Benth., loc. cit. 590.

*Trees;* branchlets terete to angulate, glabrous to densely pubescent. *Leaves* large, with 2 to many pairs of leaflets; leaflets sparsely to densely pilose, the lateral nerves numerous; rhachis winged or terete. *Inflorescence* spicate or racemose, one to several, fascicled in the axils, or paniculate or corymbose at the ends of the branchlets; peduncle generally longer than the rhachis. *Flowers* congested at the tip of the inflorescence, sessile or pedicellate; calyx tubular to turbinate, pubescent in the Central American and West Indian species, sometimes glabrescent; corolla tubular, appressed-pilose. *Legume* flat, tetragonal or subterete, pubescent or glabrate in age. SERIES . . . 1-13

### Series 1. **PUNCTATAE** J. León, ser. nov.

*Arbor;* ramuli teretes vel angulati lenticellati. *Folia* foliolorum paribus 2-4; rhachis teres glandulis sessilibus patelliformibus. *Inflorescentiae* axillares vel brevipedunculatae, 1-multi. *Flores* sessiles vel brevipedicellati; calyx brevis, tubularis, pilosus vel glaber; corolla tubularis, sparse pilosa. *Legumina* plana marginibus elevatis.

*Trees;* branchlets terete or angulate, pilose to glabrous, lenticellate. *Leaves* with 2-4 pairs of leaflets, glabrous or ferrugineous pilose; rhachis terete, the glands sessile, patelliform. *Inflorescences* axillary or in short spur, 1-many. *Flowers* sessile to shortly pedicellate; calyx short, tubular, pilose or glabrous; corolla tubular, sparsely pilose. *Legume* flat, large or small, the margins elevated.

Type species: *I. punctata* Willd.

This series forms a transition between § *Bourgonia* and the rest of § *Inga*. It is formed by one species of wide distribution and by endemics, some of them poorly known, narrowly distributed species. Four of them occur in Central America and two in the Lesser Antilles. The most aberrant of all is *I. pinetorum* of the pine dunes in the Gulf of Mexico.

SPECIES . . . 7-13

a. Branchlets, leaves and legume sparsely pilose to glabrous; calyx regular.
  b. Flowers sessile.
    c. Leaflets flat, elliptic; inflorescences 1-7 per axil; peduncle slender.
      d. Legume 6-16 cm long, 2-3 cm wide.
        e. Calyx pubescent, 3-5 mm long. Mexico to Panama ....7. I. PUNCTATA
        ee. Calyx glabrous, 6-7 mm long. Honduras .....8. I. YUNCKERI
      dd. Legume 20-32 cm long, 3.5-4.0 cm wide, Costa Rica .....9. I. LATIPES
    cc. Leaflets bullate, broadly elliptic; inflorescences solitary, the peduncle stout. Martinique .....10. I. MARTINICENSIS
  b. Flowers pedicellate.
    f. Upper leaflets 11-18 cm long. Mexico .....11. I. BREVIPEDICELLATA
    ff. Upper leaflets 8-10 cm long. Dominica .....12. I. DOMINICENSIS
aa. Branchlets, leaves and legume densely pilose; calyx often cleft. Mexico, British Honduras .....13. I. PINETORUM

7. INGA PUNCTATA Willd. in L., Sp. Pl. **4:** 1016, 1810. (Type *Hoffmannsegg s.n.* photo)

*Mimosa sericea* Poir. in Lam., Encycl. Suppl. **1:** 42, 1810 (pro parte). (Based partially on *Inga punctata* Willd.)
*Inga leptoloba* Schlecht., Linnaea **12:** 560, 1838. (Type *Schiede s.n.*)
*I. punctata* Willd. var. *panamensis* Benth., Trans. Linn. Soc. **30:** 613, 1875. (Type *Fendler 89*)
*Feuilleea leptoloba* (Schlecht.) O. Ktze., Rev. Gen. Pl. **1:** 188, 1891.
*F. punctata* (Willd.) O. Ktze., loc. cit.
*Inga popayanensis* Pittier, Contr. U. S. Nat. Herb. **18:** 185, 1916. (Type *Lehmann 5751*)
*I. ierensis* Britton, Bull. Torrey Bot. Club **50:** 52, 1923. (Type *Britton & Hazen 1627*)
*I. punctata* Willd. subsp. *chagrensis* Pittier, Jour. Dept. Agr. Porto Rico **13:** 135, 1929. (Type *Maxon 4788*)

*Trees* 6 to 15 m tall; branchlets terete or angulate, strigose-puberulent when young, glabrate in age, densely lenticellate. *Leaves* with 2-3 pairs of leaflets; leaflets elliptic to lanceolate, the apex obtuse, acute or acuminate, mucronate, the base rounded to cuneate, above lustrous, strigose-pubescent, the lateral nerves slightly prominent, straight, parallel, with the reticulate nervation conspicuous on both sides, beneath paler, sparsely pilose except on the costa and main nerves which are densely pubescent and markedly prominent, the upper pair elliptic-lanceolate, 6-17 cm long, 3-7 cm wide, the basal pair lanceolate to ovate, 3-11 cm long, 1-5 cm wide, the petiolules 1-4 mm long, pubescent; rhachis terete or submarginate, 2-11 cm long, shortly pilose to glabrate, the glands orbicular to patelliform, often obsolete; petiole terete, 1-3 cm long appressed-pubescent to glabrate, the pulvinus darker and thicker, about 1 cm long; stipules subulate, 3-8 mm long, pilose, caducous. *Inflorescences* solitary or in groups of 2-7, fascicled at the axils, or paniculate on spurs or terminal branchlets; peduncle angulate, 1.5-5.0 cm long, appressed-pilose; rhachis 0.5-3.0 cm long, densely pilose, the bracts lanceolate, acute, 2-3 mm long, pubescent, caducous. *Flowers* sessile; calyx subturbinate 3-5 mm

long, puberulent, the teeth irregular, about 0.5 mm long; corolla tubular, expanded above, 4-10 mm long, appressed-pilose, the lobes lanceolate, 1-2 mm long; staminal tube included to slightly exserted, the free part of the filaments about 1 cm long; ovary and style glabrous, the stigma capitate. *Legume* flat, straight to arcuate, oblong, 4-16 cm long, 2-3 cm wide, mucronate at the apex, rounded at the base, sparsely pilose when young, in age glabrate, the borders prominent; seeds 4-20, oblong, thick, 1-2 cm long, the aril fleshy.

Mexico to Panama; Trinidad and Tobago. (Northern part of South America.)

Vernacular names: *acotope* (Veracruz-Ll. Williams); *paterno, cerel, ixcapirol, pepeto* (Guatemala-Standley); *pepeto negro* (El Salvador-Standley); *cuajiniquil* (Costa Rica).

MEXICO: CHIAPAS: Escuintla, Monte Ovando, *Matuda 16046* (EAP, F); La Suiza, *Matuda 1915* (EAP, F, K, NY, US). OAXACA: Choapam, Yaveo, *Mexia 9258* (F, GH, MO, NY); Concordia, *Morton & Makrinius 2489* (F, US), *Reko 3618* (US); Tuxtepec, *Nelson 377* (NY). TABASCO: Balancan, Reforma, *Matuda 3220* (F, NY); San Juan Bautista-Atasta, *Rovirosa 128* (US); Tenosique, Boca Cerro, *Matuda 3548* (F, MO, NY). VERACRUZ: Barranca de Panoya, *C. A. Purpus 8556* (GH, MO, US); Cabrestos, *Liebmann 4428* (F, US); Córdoba, *Bourgeau 2043* (GH, K), *2320* (GH, US); Fortin *C. A. Purpus 8599* (GH, MO, NY, US); Fortuño, *Ll. Williams 8991* (F); Hacienda de Jovo, *Liebmann 4434* (F, US); Jalapa, Hacienda La Laguna, *Schiede s. n.* (F, GH, MO); Mata de San Juan, *Liebmann 4435* (F, US); Mirador, *Liebmann 4436* (F. GH, US), *Seler 5139* (GH), *5142* (GH); Potrero de Cazadero, *Liebmann 4433* (F); Santa Lucrecia, *Mell 520* (F, NY, US), *577* (F, US), *C. L. Smith 1146* (EAP, GH, MO, NY); Tantoyuca, *Ervendberg 4* (GH); Tezonapa, *Orcutt 3113* (F); Zacualpán *C. A. Purpus 8165* (F, GH, MO, NY, US), *8168* (GH, MO, NY, US), *8584* (GH, MO, NY, US), *10696* (GH, NY, US), *10719* (NY, US), *10784* (NY, US), *11696* (GH, NY, US), *10719* (NY, US), *10784* (NY, US), *11696* (NY, *14001* (F, MO, NY). WITHOUT LOCALITY: *Kerber 403* (US), *Sessé, Mociño, etc. 3773* (F), *3785b* (F).

BRITISH HONDURAS: BELIZE: Belize River, *Cook & Martin 34* (US); Manatee Lagoon, *Peck 334* (GH); Sibun River, *Bartlett 11369* (GH, NY, US), *Gentle 1520* (F, MO, NY, US), *1723* (F). EL CAYO: Cocquericot, *Bartlett 12068* (F, NY, US); Vaca, *Gentle 2451* (F, MO). STANN CREEK: Big Creek, *Schipp 163* (F, GH, NY, US); El Dorado, *Schipp 403* (F); Middlessex, *Schipp 380* (F, GH, K, MO, NY), *Gentle 2729* (F, NY, US); Mullins River, *Schipp 23* (F, GH, MO, US). WITHOUT LOCALITY: *Peck 571* (GH).

GUATEMALA: ALTA VERAPAZ: Gubilgüitz, *Steyermark 44333* (F), *Tuerckheim 8195* (GH, NY, US); Sepacuité, *Cook & Griggs 491* (US), *636* (US), *Owen 2* (US); Setzimaj, *Cook & Griggs 51* (US), *52* (US), *53* (US); Tactic, *Standley 90400* (F). CHIMALTENANGO: Panajabal, *Standley 62134* (F). ESCUINTLA: Las Lajas, *Standley 64821* (F); Pacayal, Sta. Emilia, *Bequaert 29* (F, GH). IZABAL: Los Amates, *Kellermann 7147* (NY); Morales, *Kellermann 6109* (US); Quiriguá, *Standley 24487* (GH, NY, US); Río Chacón, *H. Johnson 1201* (US); Sta. Inés, *Galusser 7* (F). PETEN: La Libertad, *Aguilar 419* (F, NY), *Lundell 2105* (US), *3090* (US). QUEZALTENANGO: Colombia, *Skutch 1332* (F); San Francisco de Miramar, *Pittier 68* (NY, US); Sta. María de Jesús, *Standley 68404* (F). SANTA ROSA: Las Viñas, *Heyde & Lux 6094* (F, GH, MO, NY, US). SUCHITEPEQUEZ: San Augustín, *Steyermark 48068* (F); Volcán Zunil, Monte Cristo, *Steyermark 35222* (F). WITHOUT LOCALITY: *Record & Kuylen 72* (GH, NY, US).

EL SALVADOR: AHUACHAPAN: Ataco, *Standley & Padilla 2710* (F). CABANAS: San Nicholás, *Calderón 1574,* (GH, MO, NY, US). LA LIBERTAD: Comasagua, *Calderón 1354* (GH, MO, NY, US); Santa Tecla, *Levy 784* (EAP). LA UNION: La Unión, *Carlson 663* (F). SANTA ANA: Metapán, *Carlson 785* (F). WITHOUT LOCALITY: *Renson 328* (US), *Calderón 2255* (NY, US).

HONDURAS: ATLANTIDA: Tela, *Standley 54532* (F, US), *56616* (F, US), *56870* (F, NY, US). COMAYAGUA: Pito Solo, *Edwards 436* (F), *467* (F, US). CORTES: Río Lindo, *Williams & Molina 17635* (EAP); San Pedro Sula, *Thieme 5209* (GH, US). OLANCHO: Catamarcas,

*Standley 18233* (F). TEGUCIGALPA: Mata de la Flor, *von Hagen 1140* (F, NY). YORO: Subirana, *von Hagen 1099* (F, NY).

NICARAGUA: ZELAYA: Braggman's Bluff, *Englesing 238* (F); Toumarin, Río Grande, *Molina 2414* (EAP).

COSTA RICA: ALAJUELA: La Calera, San Ramón, *Brenes 11575* (CR, F); La Palma, San Ramón, *Brenes 5353* (CR, F); Piedades, San Ramón, *Brenes 5478* (CR, F); San Carlos, *Cook & Doyle 92* (US), *Pittier 16698* (NY); San Luís de Zarcero, *A. Smith 1366* (F, NY); San Pedro, San Ramón, *Brenes 4442* (CR, F), *4677* (CR, F), *5093* (F), *6632* (CR, F); San Miguel, San Ramón, *Brenes 17040* (CR, F); Villa Quesada, *A. Smith 2929* (MO). CARTAGO: Cartago, *Stork 1223* (F); Dulce Nombre, *Standley 35882* (US); La Carpintera, *Standley 34508* (US); Turrialba, *Holdridge 2570* (IAIAS), *2571* (IAIAS), *León 1522* (IAIAS), *3811* (IAIAS), *3814* (IAIAS), *3821* (IAIAS). GUANACASTE: Líbano, *Standley & Valerio 44919* (F, NY, US); Santa Maria, *Dodge & Thomas 6262* (F, GH, MO, NY); Tilarán, *Standley & Valerio 44171* (F, NY, US), *44507* (F, NY, US), *44508* (F, NY, US), *46086* (F, NY, US). HEREDIA: Barba, *León 400* (CR, F); Río Ciruelas, *Biolley 3230* (US); San Francisco, León *3830* (IAIAS): Sto. Domingo, *Echeverría 314* (CR, F), *315* (CR, F). LIMON: Limón, *Standley 27270* (US); Shirores, *Tonduz 9354* (CR, F), *9355* (CR, F). PUNTARENAS: Golfito, *Allen 5620* (EAP, F); Puerto Jiménez, *Brenes 12223* (CR, F); Río Sándalo, *Dodge & Georger 10431* (F, MO). SAN JOSE: Cuesta de Tarrazú, *Tonduz 7859* (US); El General, *Skutch 3915* (MO, NY); San José, *Holway s. n.* (US), *Inst. Phys. Geogr. Costa Rica 17146* (US), *Jiménez 821* (US), *Standley 33286* (US), *34786* (US), *41207* (NY, US), *Tonduz 7020* (CR, MO, NY, US); Santa María de Dota, *Standley 42451* (NY, US), *42522* (NY, US).

PANAMA: BOCAS DEL TORO: Bocas del Toro. *Carleton 176* (GH); Changuinola Valley, *Cooper & Slater 73* (F, NY), *100* (US), *Dunlap 551* (F); Chíriquí Lagoon, *von Wedel 1069* (GH, MO), *1230* (GH, MO); Fish Creek, *von Wedel 2357* (MO), *2387* (GH, MO, NY). CANAL ZONE: Barro Colorado Island, *Avilés 116* (F), *Bailey 620* (F), *764* (F), *Bangham 461* (F), *Kenoyer 366* (US), *Shattuck 339* (F), *751* (F), *Wetmore & Abbe 181* (F, GH), *Woodworth & Vestal 359* (F), *Zetek 3468* (F), *3485* (F), *3837* (F, MO), *3847* (F, MO), *3848* (F), *3849* (F); Chagres, *Fendler 89* (GH, MO); Culebra, *Pittier 2309* (NY, US); Fort Sherman, *Standley 30950* (US), *31162* (US); Gatún, *Hayes 55* (NY), *Goldman 1865* (US), *Maxon 4788* (GH, MO, NY); Río Chagres, *Steyermark & Allen 16778* (GH); Vigía, *Dodge, Steyermark & Allen 16530* (GH, MO). CHIRIQUI: Boquete, *Davidson 473* (F), *814* (F), *Little 6053* (MO). COCLE: Valle de Antón, *Allen 2773* (US), *3700* (F, MO). COLON: Río Culebra, *Pittier 4161* (NY, US). DARIEN: El Real, *Allen 966* (GH, MO, NY); Pinogana, *Allen 4281* (MO). PANAMA: Chepo, *Hunter & Allen 95* (F, GH, MO, US), *Klug 33* (US); Río Tapia, *Standley 28084* (NY, US). VERAGUAS: Tabasara to Sona, *Woodson, Seibert & Allen 489* (MO). PROVINCE UNKNOWN: Bayares River, *Mell s. n.* (NY). WITHOUT LOCALITY: *Seemann 406* (GH).

TRINIDAD: without locality, *Britton & Hazen 1627* (US).

TOBAGO: Crown Grace, *Broadway 3909* (F, MO); The Widow. *Broadway 4652* (F, MO, NY).

In Mexico and Central America this species has been divided into *I. punctata* and *I. leptoloba* on the basis of the number of pairs of leaflets, two in the first, three in the second. Another differential character, mentioned by Pittier, is the shape of the base of the leaflet, rounded and wide in *I. punctata*, cuneate in *I. leptoloba*. More recently, however, the trend is to consider these species as forming a single one (cf. Schery, Ann. Missouri Bot. Gard. **37:** 221, 1950), since the variability shown by the specimens points to no consistent difference that would justify a specific segregation. After considerable study of the specimens mentioned the conclusion here reached agrees with the reduction of *I. leptoloba*. It seems necessary, however, to observe that there are some interesting points to consider for future studies: 1) In Mexico, British Honduras and Guatemala no specimen has only bijugate leaves, while the collections with trijugate leaves only form a very high percentage, and the mixed (some leaves with two pairs, others

with three in the same collection) are very rare. In contrast, 88% of the specimens from Panama have bijugate leaves, while in the intervening countries the number of collections with two and three pairs are more or less equal; 2) Measurements of the basal angle of the leaflet show that the modal value in *I. leptoloba* is smaller than in *I. punctata,* but that the total ranges overlap and no clear trend is observable; 3) There is a group of specimens from the Atlantic lowlands of Nicaragua to Panama that have large legumes, comparable in size to those of *I. latipes*—possible relationship based on this and other characters between these two species remains obscure; 4) There are some local variants, such as the trees with small, very lustrous leaflets from Costa Rica (for instance, *Dodge & Thomas* 6262), or the Panamanian "subspecies" described by Bentham and by Pittier; 5) *Inga yunckeri* of the Atlantic coast of Honduras seems to be very close to *I. punctata,* but at present no intergrading material is available; 6) Finally, the specimens from Mexico, including the type of *I. leptoloba,* seem to be the extreme in a line of variation and offer some marked characteristics, while at the other extreme of the geographic range (northern South America) the variability is more complicated, especially when some other doubtful species, such as *I. strigillosa* Benth., have to be considered. In this case it seems that although the herbarium methods show the convenience of reducing the different populations under one species, they also point the necessity of field studies, which eventually may change the position accepted here.

8. INGA YUNCKERI Standley, Publ. Field Mus. Nat. Hist., Bot. Ser., **9:** 296, 1940. (Type *Yunker, Koepper & Wagner 8805*)

*Trees* about 9 m tall; branchlets terete, striate, glabrous, lenticellate. *Leaves* with 2 pairs of leaflets; leaflets elliptic to ovate, the apex acute to acuminate, the base oblique, cuneate, above lustrous, glabrous, the nerves slightly prominent, beneath lustrous and glabrous, the lateral nerves and costa very prominent, the reticulate nervation conspicuous, the upper pair elliptic, 16-20 cm long, 6-10 cm wide, the basal pair ovate, about 9 cm long, 5 cm wide; rhachis terete, 2.5-7.5 cm long, glabrous, the glands small, cupuliform; petiole terete, 1.5-20 cm long, glabrous, the pulvinus thicker and darker. *Inflorescences* numerous, in short terminal branchlets; peduncle slender, 1.0-2.5 cm long, puberulous; rhachis 1-2 cm long, pubescent, the bracts minute, caducous. *Flowers* sessile, congested; calyx tubular, 6-7 mm long, glabrous, striate, the teeth very short and obtuse; corolla tubular, spreading above, 10-12 mm long, densely sericeous, the lobes acute, about 1 mm long; staminal tube included, the free part of the filaments about 2 cm long. *Legume* unknown.

Atlantic lowlands of Honduras.

HONDURAS: ATLANTIDA: vic of La Ceiba, *Yuncker et al. 8805* (F, MO).

This poorly known species is closely related to *I. punctata* from which it differs in the larger flowers and glabrous calyx and leaves. It is here maintained as a separate species owing to the lack of intergrading specimens, but it seems to be only an aberrant form of *I. punctata.*

9. Inga latipes Pittier, Contr. U. S. Nat. Herb. **18:** 183, 1916. (Type *Tonduz 13056*)

*Trees;* branchlets angulate, glabrous. *Leaves* with 3 pairs of leaflets; leaflets ovate to elliptic, coriaceous, the apex obtuse to acuminate, the base cuneate to rounded, above lustrous, glabrous, the nerves slightly prominent, beneath paler, glabrous, the nerves very prominent, the upper pair elliptic, 8-11 cm long, 3-5 cm wide, the basal pair lanceolate to ovate, 3-4 cm long, 1.5-2.0 cm wide, the petiolule 2 mm long, sparsely pilose; rhachis terete or canaliculate above, 3-4 cm long, glabrous, the glands prominent, hemispheric, with a narrow apical pore; petiole terete, 1.0-1.5 cm long, glabrous, the pulvinus thick and darker. *Inflorescences* axillary, solitary; peduncle terete, about 1.5 cm long, glabrous; rhachis 2.0-2.5 cm long. *Flowers* unknown. *Legume* flat, oblong, the irregular shape due mostly to a lack of development of some seeds, 20-32 cm long, about 4 cm wide, blackish, glabrous, transversely striate, the borders elevated.

Costa Rica: cartago: Las Vueltas, Tucurrique, *Tonduz 13056* (GH, NY, US).

This species is known only from fruiting specimens and its position among the gymnopodae where Pittier placed it is open to doubt. The general appearance of the plant recalls some forms of *I. punctata,* but its fruits are larger than any known from that species. However, there are several collections referred to the last species in which the legumes reach a size comparable to those of *I. latipes.* Such collections are: *Standley 19361,* from El Recreo, Dept Zelaya, Nicaragua; *Standley 30720,* from Guápiles, Prov Limón, Costa Rica; *Barbour 1045,* from Siquirres, Prov Limón, Costa Rica and *G. P. Cooper 492,* from Cricamola, Prov Bocas del Tora, Panama. All these collections are in fruit only, and the legumes exhibit a size unusual for *I. punctata* and the indument on the rhachis of leaves and branchlets is also denser than in the common forms of *I. punctata.* Only more complete material will clarify the problematic position of these collections and the relation, if any, between *I. latipes* and *I. punctata.* Although *I. latipes* was published by Pittier in 1916, it is interesting to note that he does not mention the species in his treatment of the Central American species of *Inga* published in 1929.

10. Inga martinicensis Presl, Symb. Bot. **1:** 65, 1832. (Type *Kohaut s.n.,* Sieber distr. 325)

*Mimosa fagifolia* Jacq., Select. Stirp. Amer. Hist. 264, 1763, non L. (ex char.)
*M. sericea* Poir. in Lam., Encycl. Suppl. **1:** 42, 1810 (pro parte).

*Trees,* the trunk and branches frequently crooked; branchlets terete, ferrugineous-tomentose to glabrescent, lenticellate. *Leaves* large, with 1-3 (generally 2) pairs of leaflets; leaflets coriaceous, elliptic, bullate, the apex acute, rounded or emarginate, the base acute to rounded, often asymmetric, above lustrous, pilose when young, in age glabrate, the 6-9 main nerves deeply impressed, giving a typical bullate appearance to the blade, beneath glabrous or sparsely pilose, mainly along the prominent nerves, the upper pair broadly elliptic, 9-16 cm long, 5-11 cm

wide, the basal pair elliptic to ovate-elliptic, 5-12 cm long, 5-7 cm wide; rhachis terete or marginate, 3-7 cm long, tomentose or glabrous, the glands small, cupuliform, pertuse; petiole terete to angulate, 1.5-3.5 cm long, tomentose to glabrescent, the pulvinus terete and short; stipules ovate, acute, 1-3 mm long, glabrous or tomentose, caducous. *Inflorescences* axillary, solitary; peduncle terete, 1.5-2.0 cm long, pubescent; rhachis 3-6 cm long, tomentose the bracts linear, 1.5 mm long, tomentose, caducous. *Flowers* sessile, congested; calyx campanulate 3.5-5.0 mm long, sericeous, the teeth irregular sometimes up to 2 mm long, often shorter, corolla funnelform, 7.0-8.5 mm long, sericeous, the lobes acute 2 mm long; staminal tube included, the free part of the filaments about 12 mm long; ovary pubescent. *Legume* flat, oblong, straight or slightly curved, mucronate, 10-15 cm long, 2.0-2.5 cm wide, about 0.5 cm thick, densely ferrugineous-pubescent when young, in age glabrate, the borders elevated.

Highland forests and savannas of Martinique and Guadaloupe.

Vernacular name: *pois-doux montagne* (Martinique—Duss).

GUADELOUPE: savanes aux Ananas, morne du Motelayne, *Duss 3230* (NY, US).
MARTINIQUE: Citame, *Stehlé 1391* (NY); Pitons de Carbet, *Duss 1155* (NY), *Stehlé 2177* (NY), *Stehlé 2392* (US); without locality, *Kohaut s. n.*, Sieber distr. 325 (GH, MO).

Presl based his description of *I. martinicensis* on the Kohaut collection that Sieber distributed under the name of *Mimosa coriacea.* It is frequently confused with *I. coruscans* H.B.K., a species of South and Central America, and Grisebach refers to *I. martinicensis* the type collection of *I. dominicensis* Benth., a very distinct species.

The description of *I. fagifolia* Jacq. (non L.) agrees in general with the characters of *I. martinicensis*, and the crude illustration in Stirp. Amer. Hist. *t. 164* undoubtedly represents this species. The plate shows, for instance, a leaf with only one pair of leaflets, a striking character that occurs sometimes in *I. martinicensis.* Poiret based his description of *Mimosa sericea* partially on Jacquin, and took the rest from the original description of *I. punctata* Willd.

*Inga martinicensis* seems to be related to *I. punctata*, a species that occurs in the West Indies only in Trinidad and Tobago.

11. INGA BREVIPEDICELLATA Harms in Fedde, Rep. Sp. Nov. **19:** 62, 1924, (ex char.; Type *J. A. Purpus* 282, not seen)

*Trees;* branchlets terete, glabrous, sparsely lenticellate, in age whitish and with a soft bark. *Leaves* with 3 pairs of leaflets; leaflets shortly petiolulate, oblong to oblong-obovate, the apex acute to long acuminate, the acumen up to 2 cm long, ending in a short and strong mucro, the base generally acute, rarely obtuse, above dark green, lustrous and glabrous, the nerves impressed, beneath sparsely pilose to glabrous, the 12-14 pairs of lateral nerves prominent with alternate and shorter ones between, the upper pair oblong, 11-18 cm long, 5-7 cm wide, the lower pairs oblong to oblong-obovate, the lowermost 6-9 cm long, 3-4 cm wide; the petiolules 2-4 mm long; rhachis narrowly marginate, 1.5-6.5 cm long, glabrous, the glands small, disciform, sometimes obsolete; petiole terete, 2.5-3.5 cm long,

striate, the pulvinar section conic and darker; stipules oblanceolate, 9-11 mm long, striate, pubescent, caducous. *Inflorescences* solitary or in groups of 2-3, fascicled below the new growth; peduncle slender, 4-7 cm long, striate, pilose; rhachis 1.5-2.5 cm long. *Flowers* dense, the lower with thin, pilosulose pedicels up to 2 mm long, the upper almost sessile; calyx tubular-funnelform, 2.5-3.0 mm long, sparsely pilose, more densely pilose at the base and tips, the teeth obtuse about 1.5 mm long; corolla tubular-funnelform, 6 mm long, appressed-pilose, the lobes 1.0-1.5 mm long; staminal tube included, the filaments up to 1.5 cm long. *Legume* flat, oblong, 18-22 cm long, 4-5 cm wide, less than 1 cm thick, transversely striate when young, glabrous, the borders elevated.

Highlands of Veracruz.

MEXICO: VERACRUZ: Mirador, *C. A. Purpus 10702* (NY, US), *10884* (US), *16007* (US); Zacualpán, *C. A. Purpus 8169* (GH, MO, NY, US), *8394* (GH, MO, NY, US), *8400* (GH, MO, NY, US), *10106* (F).

The species is noteworthy for its shortly pedicellate flowers and large fruits. In some characters there is a striking similarity between this species and *I. jinicuil*, especially in the shape and size of the leaflets and fruits, in the oblanceolate stipules and the structure of the bark in the oldest branchlets. In fact, the specimens in fruit are very difficult to differentiate. Their area of distribution is also more or less the same. In the general appearance of the inflorescences *I. brevipedicellata* looks like *I. punctata*, with which it is often confused in herbaria.

As far as known this species is restricted to one highland of Veracruz, where it is commonly planted as a shade tree in the coffee fields. The type from Mirador, was not available, and comes from a cultivated tree.

12. INGA DOMINICENSIS Benth., Trans. Linn. Soc. **30:** 612, 1875. (Type *Imray* 336)

*Trees*, branchlets terete or angulate, puberulous to glabrous, markedly lenticellate. *Leaves* small with 2-3 pairs of leaflets; leaflets coriaceous, ovate-lanceolate to elliptic, the apex acute, the base acute to rounded, above lustrous, glabrous, the distant nerves slightly prominent, beneath dull, sparsely pilose when young, in age glabrate, the nerves prominent, the upper pair ovate-lanceolate, 8-10 cm long, 2.5-5.0 cm wide, the basal pair elliptic, 4-6 cm long, 2-3 cm wide; rhachis slightly marginate, 1-2 cm long, glabrous, the glands minute, cupuliform, pertuse; petiole terete, the pulvinar section thicker, 1.0-1.5 cm long. *Inflorescences* solitary and axillary; peduncle slender, puberulous, about 1 cm long; rhachis angulate, 2-3 cm long, puberulous, the bracts triangular, less than 0.5 mm long. *Flowers* shortly pedicellate; calyx campanulate, about 3 mm long, strigillose, the teeth obtuse and inconspicuous; corolla funnelform, about 5 mm long, pilose, the lobes acute, 1.5-2.0 mm long; staminal tube included. *Legume* unknown.

Highland forests of Dominica.

DOMINICA: without locality, *Imray* 336 (GH, K).

Bentham separated the Imray collection from *I. martinicensis*, where Grisebach (Fl. Br. W. Ind. 227, 1861) had put it, on the basis of foliar and floral characters:

the leaflets in *I. dominicensis* have narrow, acuminate apices while in *I. martinicensis* they are obtuse to rounded; the flowers in the first species are shortly pedicellate, in the second sessile or almost so. These two species seem to come from a common stock of South American origin, but probably have undergone a long isolation, not only from each other but also from the species of the mainland, since the area from Guadeloupe to Martinique is geologically the oldest in the Lesser Antilles.

13. INGA PINETORUM Pittier, Contr. U. S. Nat. Herb. **18:** 185, 1916. (Type *Peck* 343)

Small *trees*; branchlets terete, lenticellate, densely ferrugineous-hispid to glabrescent. *Leaves* with 2, rarely 3, pairs of leaflets; leaflets elliptic to obovate, often oblique, the apex rounded, acute or shortly acuminate, the base cuneate and frequently asymmetric, above dark, lustrous, pilose especially along the nerves and margin, or glabrescent, beneath more densely ferrugineous-pilose, the nerves prominent and more pubescent, the upper pair obovate, 6-15 cm long, 3-7 cm wide, the basal pair elliptic to rhombic, 4-10 cm long, 2-4 cm wide, the petiolules terete, pilose, 2-3 mm long; rhachis terete, 2-4 cm long, hispidulous, the glands stipitate, urceolate, 1 mm in diam, glabrous; petiole terete, 1.0-2.5 cm long, densely ferrugineous-hispidulous, stipules triangular, 3-4 mm long, about 2 mm wide, glabrescent, persistent. *Inflorescences* axillary, solitary or in groups of 2-3; peduncle slender, 2.5-7.0 cm long, densely ferrugineous-pilose; rhachis 1-2 cm long, pilose, the bracts triangular, 1.5 mm long, pubescent, caducous. *Flowers* sessile to shortly stipitate; calyx tubular, sometimes deeply cleft on one side, 5 mm long, hispidulous to glabrescent, the teeth acute, 0.5-1.5 mm long; corolla tubular, spreading above, 10-11 mm long, densely hispid, the lobes acute, 1-3 mm long; staminal tube exserted. *Legume* (immature) flat, oblong, up to 7 cm long, 2.5 cm wide, densely fulvous-hispidulous when young, in age glabrate.

Lowlands of Mexico and British Honduras in dry forests; frequent in the pine formations close to the sea.

Vernacular name: *tama-tama* (British Honduras).

MEXICO: TABASCO: Achotal, Balancán, *Matuda 3098* (F, NY); Chiltepec, *Rovirosa* 738 (K, US). VERACRUZ: Coatzacoalcos, *C. L. Smith 986* (EAP, US).

BRITISH HONDURAS: All Pines, *Schipp 767* (F, GH, MO, NY); Manatee Lagoon, *Peck 343* (GH); Monkey River, *Gentle 4149* (MO, NY, US); Mountain Pine Ridge, *Bartlett 13086* (NY, US), *Lundell 6747* (F, GH, NY, US).

This species differs from others in the series PUNCTATAE in its dense and ferrugineous pubescence found upon all parts of the plant. It is closely related to *I. punctata*, although it is easily separated from this species by the longer flowers and the type of pubescence. *Inga pinetorum* is found often on the dunes close to the sea.

Series 2. **MULTIJUGAE** J. León, ser. nov.

*Arbor* vel frutex; ramuli glabri vel puberuli. *Folia* foliolorum paribus 4-10; rhachis teres glandulis patelliformibus. *Inflorescentiae* in lignum vetum axillares,

in ramis juventibus paniculatae; calyx tubularis; corolla tubularis pilosa. *Legumina* plana marginibus elevatis.

*Trees* or shrubs; branchlets glabrous or shortly pubescent. *Leaves* with 4-10 pairs of leaflets, very variable in size and shape, glabrous or sparsely pubescent; rhachis terete, the glands patelliform. *Inflorescences* axillary in the old wood or paniculate in the new growth; calyx tubular, short or long, cleft in one species; corolla tubular, pilose. *Legume* flat, less than 20 cm long, the margins elevated.

Type species: *I. multijuga* Benth.

This series is formed, with one exception, of species of wide distribution and variability. SPECIES . . . 14-17

a. Corolla more than 10 mm long; upper leaflets oblong to lanceolate.
  b. Flowers congested; foliar rhachis 9-20 cm long; calyx regular.
    c. Calyx 12-22 mm long; 5-10 pairs of leaflets; leaflets apex obtuse to acuminate ..... 14. I. MULTIJUGA
    cc. Calyx 3-4 mm long; 4-7 pairs of leaflets; leaflets acute at the apex ..... 15. I. THIBAUDIANA
  bb. Flowers distant; foliar rhachis 4-9 cm long; calyx often cleft on two sides ..... 16. I. SKUTCHII
aa. Corolla less than 10 mm long; upper leaflets obovate ..... 17. I. RUIZIANA

14. INGA MULTIJUGA Benth., Trans. Linn. Soc. **30:** 615, 1875. (Type *Hayes* 645)

*Inga aestuarium* Pittier, Contr. U. S. Nat. Herb. **18:** 183, 1916. (Type *Tonduz* 6793)

Small *trees* with low branching; branchlets terete, densely ferrugineous-tomentose when young, in age glabrate and lenticellate. *Leaves* with 5-10 pairs of leaflets; leaflets oblong to lanceolate, generally oblique, the apex rounded or obtuse to acuminate, with a short mucro, the base obtuse to rounded, often asymmetric, above lustrous, sparsely pilose to glabrous, densely pilose along the margins and costa, the nerves slightly impressed, beneath paler, densely ferrugineous-pilose, the nerves prominent, the upper pair lanceolate-elliptic, rarely oblong, 7-14 cm long, 3-5 cm wide, the basal pair lanceolate, 2.5-9.0 cm long, 1.0-4.5 cm wide, the petiolule terete, up to 3 mm long, pubescent; rhachis terete, marginate or slightly winged in the upper interfoliolar sections, 9-20 cm long, densely ferrugineous-tomentose, the glands patelliform, glabrous, the rim elevated and paler than the pore; petiole terete, slightly thicker at the pulvinar section, 1.5-2.5 cm long, densely ferrugineous-tomentose; stipules minute, ovate, about 3 mm long, caducous. *Inflorescences* axillary or terminal, solitary or geminate in the axils, or several in short terminal branchlets; peduncle terete, 1.5-5.5 cm long, densely tomentose; rhachis 1.5-2.0 cm long, the bracts minute, triangular, about 1 mm long, pubescent, caducous. *Flowers* sessile, in rather loose spikes; calyx tubular, 7-10 mm long, striate, densely ferrugineous-tomentose, the teeth less than 1 mm long, acute, regular; corolla tubular, spreading above, 12-22 mm long, sericeous, the lobes about 2.5 mm long; ovary flat, glabrous. *Legume* flat, oblong, straight or curved, 15-19 cm long, 1.5-3.0 cm wide, transversely striate, densely tomentose when young, in age glabrate, the borders elevated.

Lowlands of Costa Rica and Panama; often growing along the coasts and estuaries.

Vernacular name: *guabo de estero* (Costa Rica—Pittier).

COSTA RICA: PUNTARENAS: Boca Zacate, Río Térraba, *Tonduz 6793* (CR, US); Isla del Caño, *Holdridge s. n.* (IAIAS); Playa Blanca, Osa, *M. Valerio 469* (CR, F); Puerto Jiménez, *Brenes 12164a* (F); Río de Jesús María, Esparta, *León 3505* (IAIAS).

PANAMA: CANAL ZONE: Barro Colorado Island, *Bangham 533* (F); Chagres, *Fendler 51* (GH, MO, US); Fort Sherman, *Standley 30958* (US); Gatun Lake, *Nielsen 100* (MO), *101* (MO), *115* (MO), *118* (MO); Lion Hill Station, *Hayes 645* (F, K); Margarita Swamp, *Maxon & Valentine 7058* (US); without locality, *Epplesheimer s. n.* (F). VERAGUAS: Isla de Coiba, *Méndez 146* (US).

Within its restricted geographic area, *I. multijuga* offers a morphological variability such as few species in this genus. In the same tree the new growth produces leaves with 8-10 pairs of narrowly elliptic, thin leaflets, and solitary or geminate inflorescences with long calyces, while in the older branchlets the elliptic-lanceolate, subcoriaceous leaflets are arranged in 7-8 pairs and the inflorescences are numerous, terminal and with short calyces. Great variability is found also in different parts: the calyx length ranges from 4-10 mm long; the rhachis varies from terete to clearly winged; and in the leaflets the variability is reflected both in their number per leaf and in the shape, which varies at the apex from obtuse and mucronate to acute and long-acuminate. Small wonder, then, that Pittier attributed *Fendler 51* at GH *to I. ruiziana* G. Don, while the same number at MO and US was determined as *I. multijuga.* The Nielsen collections permit establishing a neat relation between the two types of growth.

*Inga aestuarium* Pittier may be included under *I. multijuga* perhaps as a subspecific variant. The plants under that name are small trees, which grow mainly on the borders of the sea and estuaries in the Pacific coast of Costa Rica, with fewer pairs of leaflets than is typical of *I. multijuga.* A specimen from Coiba Island, *Mendez 146,* seems intermediate between the Costa Rican and the other Panamanian specimens.

*Inga brunnescens* Britton & Killip (Type *Mutis* 3523) of central Colombia is very close to *Fendler 51* (GH) and is probably another variant of *I. multijuga.*

15. INGA THIBAUDIANA DC., Mém. Leg. **12:** 439, 1825. (Type *Thibaud s.n.* photo)

*I. gladiata* Desv., Ann. Sc. Nat., sèr. 1, **9:** 427, 1826 (*fide* Bentham).
*I. tenuiflora* Salzm. ex Benth. in Hook., Lond. Jour. Bot. **4:** 596, 1845. (Type *Salzmann s. n.*).
*I. macradenia* Mart. ex Benth., Trans. Linn. Soc. **30:** 615, 1875 (*fide* Bentham).
*I. recordii* Britton & Rose ex Standley, Trop. Woods **7:** 5, 1929. (Type *Record 40*).

Medium to large *trees;* branchlets terete, lenticellate, densely ferrugineous-pubescent, striate. *Leaves* with 4-7 (generally 5-6) pairs of leaflets; leaflets very variable in shape and size, strongly asymmetric, elliptic to oblanceolate, the apex acute to long-acuminate, the acumen often asymmetric, the base cuneate or rounded, oblique, above lustrous, sparsely pilose except along the nerves and margins where the pubescence is thicker, the nerves slightly prominent, beneath dull, closely pilose, the nerves prominent, the upper pair lanceolate or elliptic-lanceolate to oblanceolate, 7-15 cm long, 3-6 cm wide, lower pairs lanceolate to elliptic-lanceolate, strongly unequal, the upper half tapering abruptly towards the tip, the lower-

most pair 3-5 cm long, 1-3 cm wide; rhachis terete, sometimes winged in the upper interfoliolar sections, 8-18 cm long, often ending in a linear appendix about 4 mm long, densely tomentose, the glands urceolate to scutellate, up to 2 mm in diam; petiole terete, 1-2 cm long, densely tomentose, the pulvinus conic and thicker. *Inflorescences* axillary, solitary or in groups of 2-4; peduncle 3-4 cm long, densely tomentose; rhachis 1.5-3.5 cm long, the bracts small, spathulate, about 1 mm long, thick and pubescent in the back. *Flowers* sessile, in compact spikes; calyx tubular, 3-4 mm long, tomentose, the teeth minute and irregular; corolla tubular, 16-20 mm long, sericeous-villose, the lobes acute, up to 3 mm long; staminal tube included. *Legume* flat, rounded at the ends, apiculate, 6-18 cm long, about 2 cm wide, gray or ferrugineous-pubescent, the borders elevated.

Lowlands from British Honduras to Panama; Trinidad. (South America.)

Vernacular names: *tama tama, mountain bribri* (British Honduras).

BRITISH HONDURAS: Big Creek, *Schipp 19* (F, GH, MO, NY, US); Middlessex, *Hope 111* (F), *Schipp* 385 (F, GH, MO, NY); Monkey River, Toledo District, *Gentle 3691* (MO, NY), *3959* (MO, NY, US); Pine Ridge, *Bartlett 11683* (GH, NY, US); Silk Grass Forest, *Burns 25* (F, NY, US), *Gentle 2988* (NY); Temash River, *Schipp 1363* (F, GH, MO, NY, US); without locality, *Peck 496* (GH, K).

GUATEMALA: ALTA VERAPAZ: Gubilgüitz, *Tuerckheim 4090* (NY, US); Sepacuité, *Cook & Griggs 641* (US), *729* (US), *734* (US); Yaxcabnal, Gubilgüitz, *Steyermark 45095* (F). IZABAL: Bananera to La Presa, *Steyermark 38108* (F); Cerro San Gil, *Steyermark 39480* (F); Livingston, *C. L. Wilson 361* (F); Los Andes to Entrerrios, *Record 40* (GH, US); Puerto Barrios, *Standley 73046* (F); valley of Motagua, *Steyermark 38985* (F); Virginia to Lago Izabal, *Steyermark 38844* (F). WITHOUT LOCALITY: *Lewton 418* (US).

HONDURAS: COLON: Guarunta, *von Hagen 1345* (F, NY).

COSTA RICA: CARTAGO: Moravia, Turrialba, *Córdoba 331* (IAIAS). SAN JOSE: El General, *Dayton & Barbour 3128* (US), *Skutch 2518* (MO, NY), *4232* (MO, NY, US).

PANAMA: CANAL ZONE: Barro Colorado Island, *Shattuck 1122* (F), *Zetek 3834* (F); Frijoles, *Standley 27581* (US), *27588* (US), *Stevens 1272* (ILL).

TRINIDAD: Aripo road, *Broadway 5789* (MO); Caroni, *Eggers 1383* (US); Dibe valley, *Britton & Coker 1756* (GH, US); Maraval, *Britton & Hazen 1593* (GH), *Hart 5818* (US); Sangre Grande, *R. O. Williams 11853* (US). WITHOUT LOCALITY: *Trinidad Bot. Gard. Herb. 2841* (US).

This species is remarkable for the variability in the shape of the leaflets even of trees growing side by side, to which attention has been called by the collectors in Brazil, the Guianas and British Honduras. Herbarium specimens of *I. thibaudiana* are very often identified as *I. multijuga* Benth., a related Central American species.

16. INGA SKUTCHII Standley, Publ. Field Mus. Nat. Hist., Bot. Ser., **23:** 11, 1943. (Type *Skutch 4823*)

*Trees* about 9 m tall; branchlets terete, densely ferrugineous-tomentose to glabrescent. *Leaves* with 6-8 pairs of leaflets; leaflets elliptic to ovate, the apex obtuse, ending in a short, pilose mucro, the base obtuse to rounded, above glabrous except along the costa, the nerves slightly marked, the margin undulate and sparsely pilose, beneath paler, very sparsely pilose, the nerves prominent, the upper pair elliptic, 4-7 cm long, 1-2 cm wide, the basal pair lanceolate, 2-3 cm long, 1.0-1.5 cm wide, the petiolule about 1 mm long, densely pilose; rhachis terete,

slender, 4-9 cm long, densely yellow-pilose, the glands small, hemispheric, about 0.5 mm in diam, pertuse and glabrous at the apex; petiole terete, 1 cm long, densely pilose, the pulvinus conic; stipules lanceolate, 2 mm long, pilose. *Inflorescences* 1-3, axillary; peduncle slender, terete, 3-4 cm long, tomentose; rhachis 5-7 cm long, the bracts minute, lanceolate, about 3 mm long, pubescent, persistent. *Flowers* sessile or shortly pedicellate, distant, irregularly arranged on the rhachis; calyx tubular, cleft on two sides, 5-6 mm long, striate, sparsely pilose, the teeth irregular, minute, more pilose; corolla tubular-funnelform, 15-18 mm long, appressed-pilose, the lobes acute, 2 mm long; staminal tube included, the filaments about 1.5 cm long. *Legume* unknown.

Forests of western Costa Rica.

COSTA RICA: SAN JOSE: basin of El General, *Skutch* 4823 (CR, F, MO).

Noteworthy for the slender rhachises, both in the leaves and in the inflorescences and for the very distant flowers; it is close to the Panamanian *I. multijuga* and its Costa Rican variant, *I. aestuarium*, from which it differs in the loose inflorescence and deeply cleft calyx.

17. INGA RUIZIANA G. Don, Gen. Hist. Dichl. Pl. **2:** 391, 1832. (Type *Ruiz* 5)

*I. fagifolia* G. Don, loc. cit., non Willd. (*fide* Bentham).
*I. foliosa* Benth. in Hook., Lond. Jour. Bot. **4:** 597, 1845 (*fide* Bentham).
*Feuilleea ruiziana* (G. Don) O. Ktze., Rev. Gen. Pl. **1:** 189, 1891.
*Inga confusa* Britton & Rose, N. Amer. Flora **23:** 5, 1928. (Type *Pittier* 5533)

*Trees* up to 25 m tall; branchlets terete, lenticellate; with minute, appressed and ferrugineous pubescence. *Leaves* with 4-8 (generally 6-7) pairs of leaflets; leaflets obovate to ovate, sometimes asymmetric, the apex acute or acuminate, often ending in a short and strong mucro, the base acute, oblique or rounded, above slightly pilose to glabrous, the nerves impressed, beneath puberulent, the nerves reticulate and prominent, the upper pair obovate-elliptic, 15-34 cm long, 5-12 cm broad at the wider section, lower leaflets elliptic to ovate, the basal pair 3-6 cm long, 3-4 cm wide; rhachis angulate, sometimes marginate in the upper sections, 8-28 cm long, ferrugineous-puberulent, the glands sessile, patelliform, 1-2 mm in diam; petiole terete, 1-2 cm long, densely ferrugineous-puberulent, the pulvinus short and thick; stipules lanceolate, up to 5 mm long, ferrugineous-pubescent, caducous. *Inflorescences* axillary on the old wood or paniculate on the new growth, in numerous clusters of 2-4 spikes each, peduncle slender, 2.5-4.0 cm long, densely ferrugineous-pubescent; rhachis 1.0-1.5 cm long, the bracts linear, acute, 1.5 mm long. *Flowers* sessile, appressed; calyx subturbinate, 3-5 mm long, sparsely pilose, the teeth acute and small; corolla tubular, 7-9 mm long, strigose, the lobes acute, somewhat spreading, 1.0-1.5 mm long; staminal tube included, the filaments about 1 cm long. *Legume* flat, oblong, slightly curved, 8-16 cm long, 2-4 cm wide, woody, the margins elevated.

Wet lowlands of Nicaragua to Panama. (Colombia to Peru and Brazil.)

NICARAGUA: CHONTALES: Castillo Viejo, *Shimek & Smith* 535 (EAP). SAN JUAN DEL NORTE: San Juan del Norte, *C. L. Smith* 7 (EAP, GH, MO).

COSTA RICA: CARTAGO: Atirro, *León 3962* (IAIAS); Instituto de Ciencias Agrícolas, *Córdoba 89* (IAIAS), *Holdridge 2560* (IAIAS), *León 1828* (IAIAS); Juan Viñas, *Cook & Doyle 391* (US); Las Vueltas, Tucurrique, *Tonduz 13054* (CR, GH, K, NY, US); Pejivalle, *Skutch 4607* (CR, F, MO, NY, US); Santa Rosa, Turrialba, *León 1520* (EAP, IAIAS); Tuis, *Córdoba 135* (IAIAS, MO). LIMON: Limón, *Tonduz 9801* (CR, US); Río Hondo, *Pittier 16646* (US); Shirores, *Tonduz 9356* (CR). PUNTARENAS: Río Esquinas, *Allen 5842* (EAP). SAN JOSE: El General, *Skutch 2895* (GH, MO, NY, US), *3834* (MO, NY, US).

PANAMA: BOCAS DEL TORO: Chiriquí Lagoon, Punta Rovalo, *Seibert 1558* (MO); Old Bank Island, *von Wedel 2012* (GH, MO); Shepherd Island, *von Wedel 2677* (GH, MO); Water Valley, *von Wedel 844* (GH, MO). CANAL ZONE: Barro Colorado Island, *Avilés 70* (F), *112* (F), *Brown 95* (F), *Bangham 516* (F), *Shattuck 468* (F), *C. L. Wilson 4* (F), *Zetek 3826* (F), *3839* (F); Gamboa, *Pittier 6520* (GH, NY, US); Masambi, *Pittier 2674* (GH, NY, US); Obispo, *Standley 31678* (US), *31690* (US); Quebrada Salamanca, *Dodge, Steyermark & Allen s. n.* (MO). COLON: Río Fató, *Pittier 3917* (NY, US). DARIEN: Marragantí *R. S. Williams 768* (NY); Río Sambú, *Pittier 5533* (GH, NY, US).

A species which is well marked by its obovate upper leaflets and congested inflorescences generally at the end of new growth. There is no apparent reason to segregate the Central American trees into a different species as was done by Britton & Rose.

Planted often in Costa Rica and Panama as shade trees in the lower coffee belt or in the cacao grove at below 600 m elevation.

Series 3. **DENSIFLORAE** J. León, ser. nov.

*Arbor;* ramuli teretes vel angulati. *Folia* foliolis generaliter 4 minusve; rhachis plerumque alata; petiolus curtus. *Inflorescentiae* 1-4; pedunculus rhachisque curta bracteis linearibus vel lanceolatis. *Flores* sessiles congesti. *Legumina* plana marginibus laete elevatis.

*Trees;* branchlets terete or angulate, generally pubescent. *Leaves* with a low number of pairs of leaflets, generally 4 or less; leaflets pubescent to glabrous, thin, flat; rhachis commonly winged, but extremely variable even in the same species, often marginate; petiole short, winged or terete. *Inflorescences* 1-4, axillary or terminal, in one case on the old wood; peduncles short, stout or filiform; rhachis short, the bracts linear to lanceolate. *Flowers* sessile, congested; calyx short, tubular, pilose; corolla tubular, appressed-pilose. *Legume* flat, quite variable in size, the margins slightly elevated, sparsely pilose to glabrescent.

Type species: *I. densiflora* Benth.

Species of the series DENSIFLORAE are characterized by large, thin leaves with few pairs of leaflets and large, flat legumes. Its center of variation occurs in northern South America on the two sides of the Andes (see under *I. densiflora*). The Central American species form a highly complex unit, in which *I. schiedeana, I. micheliana* and *I. davidsoniae* may be only variants of *I. densiflora.* On the other hand there are several endemics with no clear relationships, such as *I. stenophylla, I. barbourii, I. hintoni.*

The DENSIFLORAE form a connection between the PUNCTATAE and the other series of this section.

a. Branchlets, leaves and legumes sparsely pilose to glabrous.
  b. Peduncle stout, pubescent or glabrous; leaves large, the upper leaflet more than 3 cm wide.
    c. Branchlets, leaves and peduncles pilose or pubescent; legume pilose or glabrous.
      d. Leaflets 4-6 pairs; corolla 5-8 mm long.
        e. Bracts linear lanceolate, 3-4 mm long. Panama, Costa Rica .....18. I. DENSIFLORA
        ee. Bracts linear, 4-9 mm long. Mexico .....19. I. SCHIEDEANA
      dd. Leaflets 3 pairs; corolla 9 mm long. Guatemala .....20. I. MICHELIANA
    cc. Branchlets, leaves and peduncles glabrous; legume glabrous or covered with scales.
      f. Leaves thin, 5-6 pairs of leaflets; upper pair 11-14 cm long; legume white-lenticellate. Costa Rica .....21. I. SQUAMIGERA
      ff. Leaves coriaceous; 4 pairs of leaflets; upper pair 8 cm long; legume sparsely pilose. Panama .....22. I. DAVIDSONIAE
  bb. Peduncles filiform, sparsely pilose to glabrous; leaves small, the upper pair less than 3 cm wide.
    g. Upper leaflets oblong-lanceolate to falciform, 1.0-1.5 cm wide, acute at the apex; rhachis terete to marginate. Costa Rica .....23. I. STENOPHYLLA
    gg. Upper leaflets elliptic to oblong, 2-3 cm wide, clearly mucronate; rhacis marginate to broadly winged.
      h. Inflorescences in short spurs; corolla 6-7 mm long; leaflets glossy. Mexico .....24. I. TENUIPEDUNCULATA
      hh. Inflorescences axillary; corolla less than 4 mm long; leaflets opaque. Costa Rica .....25. I. BARBOURII
aa. Branchlets, leaves and legumes densely ferrugineous pilose.
  i. Calyx 3-5 mm long; leaves bullate. Legume thin. Mexico .....26. I. HINTONI
  ii. Calyx 7-9 mm long; leaves flat; legume thick. El Salvador-Mexico .....27. I. CALDERONI

18. INGA DENSIFLORA Benth., Trans. Linn. Soc. **30:** 617, 1875. (Type *Spruce 4504*)

*I. langlassei* Pittier, Contr. U. S. Nat. Herb. **18:** 189, 1916. (Type *Langlassé 63*)
*I. mollifoliola* Pittier, loc. cit. (Type *Pittier 3251*)
*I. monticola* Pittier, loc. cit. 190. (Type *R. S. Williams 316*)
*I. sordida* Pittier, loc. cit. 191. (Type *Lehmann 904*)
*I. montealegrei* Standley, Publ. Field Mus. Nat. Hist., Bot. Ser., **18:** 1154, 1938. (Type *Montealegre 1*)

*Trees*; branchlets terete, striate, densely yellow-tomentose when young, in age glabrate and lenticellate. *Leaves* with 4-6 (generally 4) pairs of leaflets; leaflets asymmetric, oblong to obovate, the apex acute to acuminate, sometimes mucronate, the base oblique, acute to rounded, above lustrous or dull, sparsely pilose to glabrous, the nerves prominent and more pubescent, beneath paler, densely to sparsely pilose, the nerves prominent with conspicuous reticulate nervation, the upper pair elliptic to obovate-elliptic, 7-18 cm long, 3.5-7.0 cm wide, the basal pair lanceolate-elliptic, 2.5-4.0 cm long, 1.5 cm wide, the petiolule very short, 1 mm long, pilose; rhachis marginate to slightly winged above, terete below, 5-10 cm long, yellow-pilose, especially on the midnerve, ending in a linear and pilose appendix, the glands patelliform, black, 1.5-2.0 mm in diam; petiole terete or marginate above, 1-2 cm long, densely yellow-pilose, the pulvinus conic, fleshy and black; stipules subulate, 2-5 mm long, striate, caducous. *Inflorescences* axillary, 2-4; peduncle terete, 4-6 cm long, striate, pilose; rhachis short, 1-3 cm long, the bracts linear-lanceolate, 3-4 mm long, pilose, semi-persistent. *Flowers* congested,

sessile; calyx tubular, 2.5-5.0 mm long, sparsely pilose to glabrate above, densely pilose at the base, the teeth small, irregular, 1.0-1.5 mm long; corolla tubular, widening towards the apex, 6.5-9.0 mm long, appressed-pilose, the lobes acute, about 1 mm long; staminal tube included. *Legume* flat, oblong, 8-22 cm long, 3-8 cm wide, finely pilose when young, in age glabrate, transversely striate, the borders elevated.

Costa Rica to Panama. (Northern South America.)

COSTA RICA: ALAJUELA: La Palma, San Ramón, *Brenes 6805* (CR, F, IAIAS), *19001* (CR, F); La Paz, San Ramón, *Córdoba 180* (IAIAS); Palmares, *Córdoba 190* (IAIAS); Piedades, San Ramón, *Brenes 5459* (CR, F, IAIAS), *5469* (CR, F), *5842* (CR, F); San Isidro, San Ramón, *Córdoba 182* (IAIAS), *183* (IAIAS), *184* (IAIAS), *185* (IAIAS); San Miguel a La Palma, San Ramón, *Brenes 17049* (CR, F); San Pedro, San Ramón, *Brenes 4341* (CR, F), *4673* (CR, F), *4676* (F), *4826* (F), *4843* (F), *5002* (F), *6634* (CR, F), *19456* (CR, F, IAIAS), *19479* (CR); San Ramón, *Córdoba 181* (IAIAS); Santiago, San Ramón, *Brenes 17186* (CR, F). CARTAGO: Atirro, *León 1921* (IAIAS); Instituto de Ciencias Agrícolas, *Córdoba 91* (IAIAS), *Holdridge 2550* (IAIAS), *León 1850* (EAP, IAIAS); Santa Rosa, Turrialba, *León 2448* (EAP, IAIAS). SAN JOSE: Pavas, *Montealegre 1* (CR, F), *2* (CR, F); Rodeo de Pacaca, *Pittier 3251* (CR, US); San Marcos de Dota, *Tonduz 7548* (CR).

PANAMA: COCLE: Bismarck, above Penonomé, *R. S. Williams 316* (US). SAN BLAS: Permé, *G. P. Cooper 651* (F, NY, US).

*Inga densiflora* is one of the most variable species in the genus. In Costa Rica it is very commonly planted as a shade tree in the coffee fields of the highlands; the populations in that area are distinguished by the dense tomentum and short leaflets. The type most common in the coffee fields (*I. montealegrei*) has more glabrous and larger leaflets. The populations are so variable that they are assigned different specific names in the herbaria. The numerous collections made by Brenes, and large local samples taken by the author, show all sort of intergradations among these populations (i.e., broadly winged to slightly marginate rhachises, etc.). In the present treatment, two species of northern Central America are maintained because of the lack of intergrading materials. But it is possible that future collections may prove that *I. micheliana*, *I. schiedeana* and the Panamanian species *I. davidsoniae* are only aberrant populations of *I. densiflora*.

It is necessary to point out that *I. densiflora* has a series of more complex populations in northern South America. In Colombia they receive several names: *I. sordida* Pittier, *I. langlassei* Pittier, *I. microdontha* Britton & Killip, *I. tiribiana* Britton & Killip, etc. All of them show a remarkable similarity among themselves and with the type specimen of *I. densiflora* at Kew. In Venezuela *I. heinei* Harms and *I. limonensis* Pittier also belong to the group mentioned above, while *I. java* Pittier, as noted by Schery (Ann. Missouri Bot. Gard. **37:** 196, 1950), is similar to many Central American specimens. Types of the above taxa were studied.

19. INGA SCHIEDEANA Steud., Nom. Bot. **1:** 810, 1840. (Based on *I. flexuosa* Schlecht., non Graham)

*I. flexuosa* Schlecht., Linnaea **12:** 559, 1838, non Graham. (Type *Schiede 674*)
*I. pringlei* Harms in Fedde, Rep. Sp. Nov. **13:** 526, 1915. (Type *Pringle 8125*)

Small *trees;* branchlets terete or angulate, densely ferrugineous-puberulent when young, in age glabrate and lenticellate. *Leaves* with 4-6 (generally 5) pairs of leaflets; leaflets oblique, obovate-elliptic to lanceolate, the apex acute to acuminate, the base cuneate to rounded, often asymmetric, above opaque to sub-lustrous, sparsely pubescent and more densely on the costa and margin, the nerves prominent, beneath paler, sparsely pilose, the lateral nerves and reticulate nervation prominent, the upper pair elliptic-obovate, often oblique, 6-9 cm long, 2.0-3.5 cm wide, the basal pair considerably smaller, lanceolate to elliptic, 2-5 cm long, 1-2 cm wide, the petiolules very short, densely ferrugineous-pubescent; rhachis winged, the wings often restricted to the upper interfoliolar sections, 6-10 cm long, the glands minute, crateriform, glabrous; petiole terete, 1.0-1.5 cm long, densely ferrugineous-puberulent. *Inflorescences* axilliary or terminal, solitary or in groups of 2-3; peduncle terete, 3-5 cm long, densely ferrugineous-tomentose; rhachis 2.5-3.0 cm long, the bracts linear-lanceolate, 4-9 mm long, pubescent. *Flowers* sessile, congested, soon deciduous; calyx conic, cleft on two sides, 6-7 mm long, striate, sparsely pilose, the teeth irregular, 1-2 mm long, more pilose; corolla tubular, 7-8 mm long, appressed-pilose, the lobes acute, 1.5 mm long; staminal tube included. *Legume* unknown.

Highlands of Veracruz, Mexico.

MEXICO: VERACRUZ: Jalapa, *Pringle 8125* (F, GH, MO), *Schiede 674* (GH).

*Inga schiedeana* is very closely related to *I. densiflora* of southern Central America. Neither of these species has been reported from Guatemala to Nicaragua.

20. INGA MICHELIANA Harms in Fedde, Rep. Sp. Nov. **13:** 525, 1915. (Type *Heyde & Lux 3319*)

*Trees;* branchlets terete or angulate, minutely puberulent when young, in age glabrate. *Leaves* with 3 pairs of leaflets; leaflets subchartaceous, elliptic to lanceolate, the apex obtuse, ending in a short mucro, the base cuneate, obtuse or rounded, above lustrous, sparsely pilose, the nerves prominent and more densely pubescent, beneath paler, densely pilose, the nerves conspicuous; the upper pair elliptic, oblique, 5.5-7.5 cm long, 2.5-1.5 cm wide, the petiolules very short and pilose; rhachis winged, 3-6 cm long, pilose especially on the midnerve, the glands crateriform, glabrous; petiole terete, about 1.5 cm long, densely ferrugineous-puberulent. *Inflorescences* axillary, solitary or geminate; peduncle 2.5-4.0 cm long, ferrugineous-tomentose; rhachis about 1.5 cm long, the bracts minute, ovate, about 1 mm long, densely pubescent. *Flowers* sessile, congested; calyx tubular, 5 mm long, pilose, the teeth small, irregular, 0.5-1.0 mm long; corolla tubular, 9-11 mm long, densely appressed-pilose, the lobes acute, 1.5 mm long; staminal tube included. *Legume* unknown.

Highlands of northern Guatemala.

GUATEMALA: QUICHE: Río Negro, *Heyde & Lux 3319* (GH, MO).

Definitely known only from the type collection; the small size of the bracts and shape of the calyx help to separate it from the Mexican *I. schiedeana.*

21. INGA **SQUAMIGERA** J. León, sp. nov.

*Arbor* 8-15 alta; ramulis angulatis glabris dense lenticellatis. *Foliola* plerumque 5-6-juga (rariore 4-7) elliptica vel oblonga, apice late acuminata mucro 1 mm longo, basi obtusa, assimetrica, supra glabra nitida viridia opaca vel glauca, subtus pallidioria glabra nervis prominentibus, superioria oblonga vel elliptica 11-14 cm longa 5-6 cm lata, media elliptco-oblonga 8-14 longa 3-4 cm lata, inferioria lanceolata 5-9 cm longa 2-3 cm lata, petiolulis 1 mm longis pilosis; rhachibus marginatis 10-18 cm longis pilosis, glandulis interfoliolaribus patelliformibus circa 2 mm diametralis foramine profundo; petiolis marginatis vel teretibus glabrescentibus 3-4 mm longis; stipulis linearibus 7 mm longis caducis. *Inflorescentia* ignota. *Legumen* oblonga lata vel recurvata marginibus prominentibus 12-16 cm longa 4-5 cm lata transverse striata junior pallide lenticellata glabrescens.

*Trees*, 8-15 m tall, with an open crown; branchlets angulate, densely lenticellate, glabrous. *Leaves* with 4-7, generally 5-6 pairs of leaflets; leaflets lanceolate to elliptic, asymmetric, undulate, the apex abruptly acuminate, shortly mucronate, the base obtuse, strongly asymmetric, the lower side narrower in the median and upper leaflets, above light green, lustrous, completely glabrous, the lateral nerves slightly prominent, beneath paler, glabrous, the costa and lateral nerves prominent and sparsely pilose, borders markedly undulate, the upper pairs oblong 11-14 cm long, 5-6 cm wide, the median pairs elliptic-oblong 8-14 cm long, 3-4 cm wide, the lower pair lanceolate 5-9 cm long, 2-3 cm wide, the petiole 1 mm long, pilose; rhachis marginate, canaliculate above, 10-18 cm long, very sparsely pilose, the glands patelliform, 1.5-2 mm diameter; petiole marginate, the pulvinus darker and thicker, 4-5 long; stipules linear, 7 mm long 2 mm wide, pilose, caducous. *Inflorescences* solitary or in groups of 2-4, on the old branches or on defoliated nodes of the branchlets. Peduncle thick, terete, densely brown, pilose, lenticellate, 0.1-1.0 cm long; rhachis thick, cylindric, pilose, 2-3 cm long, the bracteoles spathulate, pilose 2-3 mm long, semicaducous. *Flowers* unknown. *Legume* flat, elliptic, oblong, 12-16 cm long, 4-5 cm wide, 1.5-2.0 cm thick, transversely striate, the borders well developed, when young completely covered with white scales giving a striking appearance to the fruits, in age smooth and green. (The white, powdery scales, of variable size and shape, completely cover the fruits; mites and aphids are common among them.)

Wet lowlands of northern Costa Rica; planted as coffee shade in the San Carlos valley.

COSTA RICA: ALAJUELA: road to Upala, at La Bijagua, *Léon 4869* (CR, HOLOTYPE IAIAS, MO); Florencia de San Carlos, *Léon 5000* (IAIAS).

This species is closely allied to *I. densiflora*, differing in the completely glabrous foliage and in the almost white fruits lenticellate at early stages. It is frequent in forests and pastures and often planted as shade trees in the coffee fields of the San Carlos-Río Frío watershed, an area which has not been explored botanically.

22. INGA DAVIDSONIAE Standley, Publ. Field Mus. Nat. Hist., Bot. Ser., **22:** 79, 1940. (Type *Davidson 943*)

*Trees* 4-9 m tall, densely branched; branchlets terete, minutely tomentose to glabrescent, lenticellate. *Leaves* with 3-5 pairs of leaflets; leaflets coriaceous, distant, elliptic to ovate, the apex acute to obtuse, mucronate, the base rounded or obtuse, asymmetric, above sparsely pilose to glabrescent, glossy, the nerves impressed, beneath sparsely pilose to glabrescent, the main nerves prominent and pilose, the upper pair elliptic, up to 8 cm long, 4 cm wide, the intermediate elliptic to lanceolate, sometimes strongly asymmetric, the lower pair ovate, about 2.5 cm long, 1.5 cm wide, the petiolules short, pilose; rhachis narrowly winged or marginate, 2.0-7.5 cm long, pubescent on the midnerve, the glands conic or cupuliform, less than 1 mm long, glabrous; petiole terete, the pulvinar section black, 0.5-2.0 cm long, tomentose. *Inflorescences* axillary; peduncle about 3.5 cm long; rhachis about 1.5 cm long. *Flowers* unknown. *Legume* flat, oblong, straight or curved, truncate to apiculate at the apex, the base rounded, 11-12 cm long, 4 cm wide, the borders elevated.

Cloud forests of western Panama, at 2250 m elev; known only from the type collection.

PANAMA: CHIRIQUI: Boquete, Volcán Chiriquí, *Davidson 943* (F, MO).

This imperfectly known species seems to be related to *I. densiflora* which is frequent at lower elevations. The glossy and glabrescent leaves are unusual in this genus.

23. INGA STENOPHYLLA Standley, Publ. Field Mus. Nat. Hist., Bot. Ser., **18:** 499, 1937. (Type *Brenes 6841*)

*Trees;* branchlets terete, lanose when young, in age glabrate, densely lenticellate. *Leaves* with 4-7 pairs of leaflets; leaflets subcoriaceous, oblong to linear-lanceolate, the apex straight to falcate, acuminate, the base oblique, acute, above deep green, lustrous, sparsely pilose, the pubescence more dense on the impressed nerves and margins, beneath paler, sparsely pilose to glabrous, the nerves slightly prominent, the upper pair oblique, oblong-lanceolate to falciform, 5-7 cm long, 1.0-1.5 cm wide, the lower pairs oblong-lanceolate, the basal pair 3.0-5.5 cm long, 1.0-1.5 cm wide, the petiolule very short, pilose; rhachis very narrowly winged in the upper interfoliolar sections, slender, 5-9 cm long, sparsely pilose to glabrous, the glands minute, shortly stipitate, glabrous; petiole terete, 1-2 cm long, the pulvinus conic. *Inflorescences* axillary on the old wood or paniculate on the young branchlets, the spikes solitary or in groups of 2-4; peduncle slender, 1-4 cm long, striate, densely pilose, sometimes with an empty bract in the upper part; rhachis angulate, 2.0-2.5 cm long, pilose, the bracts minute, lanceolate, about 1.5 mm long, densely pubescent, caducous. *Flowers* sessile, closely appressed; calyx campanulate, 2-3 mm long, pilose, the segments obtuse, about 1 mm long; corolla tubular, 6-7 mm long, pilose, the lobes acute, 1.0-1.5 mm long; staminal tube included, the filaments 1.0-1.5 cm long. *Legume* (immature) flat, oblong, acumi-

nate, 18-22 cm long, 1.0-1.5 cm wide, sparsely pilose, the borders elevated; seeds 9-15.

Highland forests of central Costa Rica.

Costa Rica: alajuela: La Calera, San Ramón, *Brenes 11574* (CR, F); La Palma, San Ramón, *Brenes 5802* (CR, F, IAIAS); Santiago, San Ramón *Brenes, 6707* (CR, F, IAIAS), *6841* (CR, F, IAIAS); San Ramón, *Brenes 382 [566]* (F, US). san jose: Tarbaca, *León 3829* (MO, IAIAS).

In *I. stenophylla* the leaf rhachis varies from winged to almost terete; in this and the floral characters the position of this species seems to be intermediate between this series and the series PUNCTATAE.

24. Inga **tenuipedunculata** J. León, sp. nov.—Fig. 3.

*Arbor* 15-24 m alta; ramulis teretibus glabris dense lenticellatis. *Foliola* plerumque 4-(rarius 5-)juga elliptica vel lanceolata, apice late acuminata mucro lineari ca 1.5 mm longo, basi acuta oblique, supra saturate viridia opaca sparsissime pilosa vel glabra costa nervisque lateralibus prominentibus et pilosioribus, subtus palliodoria pilosa vel glabra nervis gracilibus prominentibus, superiora anguste elliptica 5-9 cm longa 2-3 cm lata, inferiora lanceolata vel ovata 1.5-2.0 cm longa 0.7-1.0 cm lata, petiolulis ca 1 mm longis pilosis; rhachibus alatis 4-8 cm longis costa dense pilosis, alis anguste oblongis 2 mm latis glabris, glandulis interfoliolaribus tenuis elevatis 2-3 mm longis glabris foramine profundo; petiolis teretis vel alatis 1.0-1.5 cm longis glabrescentibus, pulvino crassiori glabro; stipulis anguste lanceolatis ca 4 mm longis ciliatis subpersistentibus. *Inflorescentiae* in ramulis brevibus lateralibus paniculatae; pedunculis filiformibus teretibus 3-6 cm longis sparse pilosis; rhachibus ca 2 cm longis, bracteis lanceolatis 1 mm longis pilosis deciduis. *Flores* sessiles remoti; calyce tubuloso 3-4 mm longo, dentibus obtusis minutis; corolla tubulosa infundibuliformi 6-7 mm longa appresse pilosa, lobis acutis ca 2 mm longis; tubo staminali incluso. *Legumen* ignota.

Lowlands of Veracruz, Mexico.

Vernacular names: *acotopillo, frijolillo* (Veracruz—Ll. Williams).

Mexico: veracruz: Fortuño, Coatzacoalcos River, *Ll. Williams 8935* (F), *9029* (F, holotype NY).

*Inga tenuipedunculata* has no close ally in Central America. It is very similar to *I. acuminata* Benth. in leaflet shape, the type of narrow wings in the rhachis and the position of the inflorescences on short spurs. It lacks, however, the congested inflorescences and irregular calyces which characterize *I. acuminata*.

25. Inga barbourii Standley, Publ. Field Mus. Nat. Hist., Bot. Ser., **23:** 55, 1944. (Type *Barbour 1008*)

*Trees* to 20 m tall; branchlets terete, puberulent to glabrescent, densely lenticellate. *Leaves* with 4-6 pairs of leaflets; leaflets elliptic to lanceolate, the apex acute to acuminate, ending in a straight and short mucro, the base acute to rounded, above sublustrous, sparsely pilose to glabrous, the costa prominent and

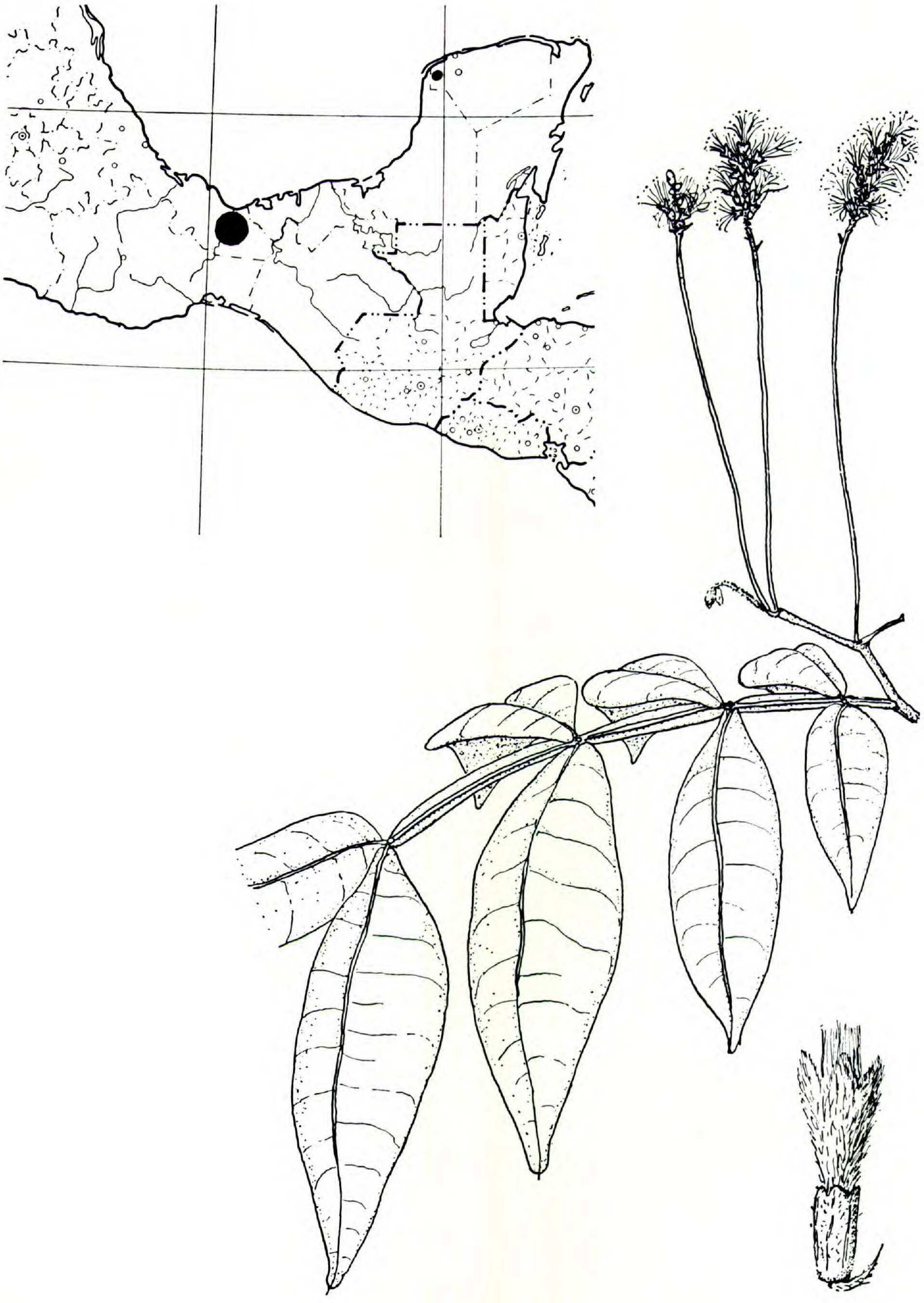


Fig. 3. *Inga tenuipedunculata* J. León

more pilose, the lateral nerves inconspicuous, beneath sparsely pilose, the margin pilose, the main nerves prominent and more pubescent, the nervation finely reticulate and conspicuous, the upper pair elliptic, 6-9 cm long, 2-3 cm wide, the basal pair lanceolate-elliptic, 1.5-2.0 cm long, 0.7-1.5 cm wide, the petiolule very short and pilose, giving a sessile appearance to the leaflets; rhachis narrowly and elliptically winged, 3-5 cm long, pilose especially along the midnerve, the glands small, crateriform, glabrous; petiole terete or marginate, 0.5-1.5 cm long, densely ferrugineous-puberulent when young, in age glabrate, the pulvinus thick and darker; stipules lanceolate, 2 mm long, pilose, deciduous. *Inflorescences* 1-4, axillary on the new growth; peduncle terete, filiform, 1-3 cm long, sparsely pilose; rhachis 0.7-1.0 cm long. *Flowers* minute, sessile, congested; calyx tubular, 2-3 mm long, pilose; corolla tubular, 5-6 mm long appressed-pilose. *Legume* flat, oblong, the apex rounded and ending in a short acumen, the margins elevated, the base rounded, 5-6 cm long, 1 cm wide, sparsely pilose to glabrescent.

COSTA RICA: ALAJUELA: Puente La Vieja, San Carlos, *León* 3578 (IAIAS). CARTAGO: Pavones, Turrialba, *Barbour 1008* (CR, F); Río Tuis, *León* 3842 (IAIAS, MO).

An endemic species not uncommon in the wet subtropical forests of Costa Rica between 500-600 m elevation; it is a large tree, with loose foliage, rather attractive for its small, light green leaves.

These trees do not bloom as often as other species. Several plants were observed for four years without showing any signs of flowers, in spite of the production of several flushes every year.

26. INGA HINTONI Sandwith, Kew Bull. **1937:** 304, 1937. (Type *Hinton 7617*)

*Trees* 5 to 12 m tall; branchlets terete, densely ferrugineous-pilose in the young growth, in age glabrate and lenticellate. *Leaves* with 3-6 pairs of leaflets, the terminal pairs with a trend to congestion; leaflets chartaceous, slightly bullate, elliptic to ovate, the apex obtuse, mucronate, the base slightly oblique, rounded, above lustrous, glabrous to sparsely pilose on the main nerves and margins, the nerves well impressed, beneath glabrous to sparsely pubescent, the nerves prominent and pilose, the upper pair elliptic to elliptic-lanceolate, 3-15 cm long, 1.5-5.0 cm wide, the lower pairs considerably smaller, lanceolate to oval-lanceolate, the basal pairs 1.5-5.5 cm long, 1-3 cm wide, the petiolule short, about 1 mm long, conic, dark, pubescent; rhachis winged, 2.0-5.5 cm long, sparsely pubescent, the wings cuneate to rhombic, each up to 6 mm wide, the glands small, cupuliform, pertuse at the apex, about 0.5 mm long, the terminal appendix linear, 2 mm long, pilose; petiole terete, 0.7-1.5 cm long, densely ferrugineous-pubescent, the pulvinus conic and darker, 2-3 mm long; stipules small, triangular, 2-3 mm long, persistent. *Inflorescences* axillary, solitary or in groups of 2-3, peduncle slender, 2.0-3.5 cm long, ferrugineous-pubescent; rhachis 1.5-3.0 cm long, the bracts linear-spathulate, up to 2 mm long, pilose. *Flowers* sessile or shortly pedicellate, congested; calyx campanulate, cleft on one side, 3 mm long, pilose, the teeth irregular, 1.0-1.5 mm long, densely pilose towards the tips; corolla funnelform, 5-6 mm long, pilose, the lobes acute, 1.5-2.0 mm long; staminal tube included; ovary glabrous.

*Legume* flat, oblong, mucronate at the apex, 4-14 cm long, 1.5-2.5 cm wide, ferrugineous-pubescent to glabrate in age, the margins elevated.

Highlands of Mexico, from Michoacan to Chiapas.

Vernacular name: *jaquinicuil* (Mexico—Hinton).

MEXICO: CHIAPAS: Buena Vista, Escuintla, *Matuda 1899* (K, NY, US); Cascadas, Siltepec, *Matuda 5158* (EAP, F). MEXICO: Nanchititla, Temascaltepec, *Hinton 6171* (MO, US), 7617 (US), *7667* (F), *8103* (MO, US), *8232* (F, GH, MO, NY, US); Temascaltepec, *Hinton 4182* (MO, US), *8978* (GH, MO, NY, US); Rincón, Temascaltepec, *Hinton 456* (GH), *11202* (F, GH). MICHOACAN: Hacienda Coahuayula, *Emrick 48* (F).

This species, well known in central Mexico for its edible pods, is generally found above 1500 m elevation.

27. INGA CALDERONI Standley, Jour. Wash. Acad. Sci. **13:** 352, 1923. (Type *Calderón 1392*)

Low *trees,* up to 8 m tall; branchlets terete, densely fulvous-hispid, in age glabrous and lenticellate. *Leaves* with 4-7 pairs of leaflets; leaflets asymmetric, lanceolate to elliptic, the apex narrower, sometimes curved, acute to acuminate, the base rounded to oblique, asymmetric, above fulvous-pilose, the nerves impressed, beneath dull, more densely pilose, the nerves prominent, the upper pair lanceolate to elliptic, 6-9 cm long, 2.0-2.5 cm wide, the lowermost pair 2-4 cm long, 1.0-1.5 cm wide; rhachis winged, 5-8 cm long, pilose, the wings cuneate, broader towards the apical end, sometimes lacking in the lower sections, the glands long pedicellate, the pedicel slender, 2-4 mm long, pilose, pertuse and glabrous at the apex; petiole terete, 0.5-1.0 cm long, densely fulvous-pilose. *Inflorescences* solitary, axillary; peduncle terete, 2-3 cm long, pilose; rhachis 2.5-5.5 cm long, the bracts linear, 10-12 mm long, 1-2 mm wide, densely pilose, caducous. *Flowers* dense, sessile; calyx tubular 6-14 mm long, striate, densely pilose to glabrescent, the teeth acute, 1-2 mm long; corolla tubular, spreading above, 12-14 mm long, appressed-pilose; staminal tube included, the filaments about 2.5 cm long. *Legume* oblong, thick, 5-10 cm long, 3.0-3.5 cm wide, about 1 cm thick, markedly apiculate, the base rounded, densely ferrugineous-tomentose, the margins elevated; seeds large, surrounded by an edible aril.

Dry lowlands of western Central America from Mexico to Salvador.

Vernacular name: *pepeto de mico* (Salvador—Calderón).

MEXICO: CHIAPAS: Sta. Rosa, Escuintla, *Matuda 4236* (F, MO, NY, US).
GUATEMALA: SACATEPEQUEZ: Barranco Hondo, *Standley 88950* (F, US).
SALVADOR: AHUACHAPAN: Sierra de Apaneca, Finca Colima, *Calderón 20186* (GH). LA LIBERTAD: Comasagua, *Calderón 1392* (GH, US); Santa Tecla, *Calderón 1513* (GH, US), *Standley 23018* (NY, US).

Pittier included this species with his EUINGA-TETRAGONAE on account of the fruits; these and the floral characters, as well as the glands, however, are more close to those of the series DENSIFLORAE where it is here provisionally placed until better flowering material may clear its definite position.

Series 4. LEPTANTHAE Benth. in Hook., Lond. Jour. Bot. **4:** 602, 1845, emend.

Small *trees* or *shrubs*. Branchlets terete, hispid, in age glabrous. *Leaves* small, hispid, with 2-3 pairs of leaflets (in the Central American species); rhachis winged, with long-stipitate glands. *Inflorescences* 1-few; bracteoles lanceolate, pilose, persistent; calyx setose, the teeth subulate; corolla tubular appressed-pilose. *Legume* flat, ferrugineous-hispid.

The LEPANTHAE as here defined exclude some species, such as *I. acuminata*, which Bentham (Trans. Linn. Soc. **30:** 618, 1875) included in the group. This series is formed mainly by Brazilian species; the Guatemalan *I. cookii* is a remnant of a formerly widely distributed group. SPECIES . . . 28

28. INGA COOKII Pittier, Contr. U. S. Nat. Herb. **18:** 203, 1916 (Type *Cook & Griggs 505*)

*I. subvestita* Standley, Publ. Field Mus. Nat. Hist., Bot. Ser., **22:** 27, 1940. (Type *C. L. Wilson 315*)

*Trees* 3 to 8 m tall; branchlets terete, hispid or glabrescent. *Leaves* with 2-3 (rarely 4) pairs of leaflets; leaflets shortly petiolulate, obovate to ovate, acute to markedly acuminate at the apex, acute to obtuse and asymmetric at the base, above fulvous-pilose, with the nerves and costa deeply impressed and more pubescent, beneath densely fulvous-pilose, the main secondary nerves prominent and anastomosing close to the margin, leaving alternate and incomplete nerves between, the upper pair obovate to elliptic-obovate, 3-15 cm long, 2-7 cm wide, the basal pair ovate to elliptic, 2-7 cm long, 1-4 cm wide; rhachis winged, 1.5-12 cm long, hispid, the glands long and slenderly pedicellate, up to 2 mm long, glabrous and pertuse at the apex; petiole terete or winged, 0.5-8.0 cm long, hispidulous. *Inflorescences* axillary and solitary; peduncle slender, 3-8 cm long, setose; rhachis 1.5-3.5 cm long, pilose, the bracts lanceolate, 2-4 mm long, densely pilose, semipersistent. *Flowers* sessile or pedicellate; pedicel slender, up to 2 mm long, pilose; calyx tubular, 3-5 mm long, setose especially towards the tips, the lobes subulate, regular, separated by rounded sinuses, 1.0-1.5 mm long; corolla tubular-funnelform, 9-14 mm long, sparsely and long pilose, the lobes acute, 1.0-2.5 mm long, more pubescent; staminal tube included. *Legume* flat, oblong, 9-12 cm long, 4-5 cm wide, about 1 cm thick, densely ferrugineous-hispid, the margins not elevated.

Wet forests of Guatemala and Honduras, especially in the Caribbean watershed, from sea level to 1500 m elevation.

Vernacular name; *guamo de playa* (Honduras—Standley).

GUATEMALA: ALTA VERAPEZ: Campur to Socoyo, *Standley 91712* (F); Chirriacté, *Standley 91637* (F); Cobán, *Standley 69381* (F), *91544* (F), *92687* (F); Cobán to San Pedro Carchá, *Standley 89779* (F), *89988* (F); Cocolá, NE of Carchá, *Standley 70296* (F); Finca Transvaal, *C. L. Wilson 315* (F); Gubilgüitz, *Steyermark 44407* (F); Santa Cruz, Río Frío, *Standley 90207* (F); Santa Cruz to Tactic, *Standley 92277* (F); Sachaj, *Steyermark 45159a* (F); Sepacuité, *Cook & Griggs 103* (US), *202* (US), *226* (US), *505* (US). HUEHUETENANGO: Maxbal, *Steyermark 48852* (F). IZABAL: Bananera to La Presa, *Steyermark 38192* (F).

HONDURAS: ATLANTIDA: Tela, *Standley 54256* (US). COMAYAGUA: Siguatepeque, El Achiote, *Yuncker, Dawson & Youse 6292* (F, GH, MO), *6678* (GH).

*Inga cookii* is one of the most interesting species of this genus in Central America. Its closest allies are a group of Brazilian and Guianan species including *I. leptantha, I. ciliata,* etc. Especially striking are the type of setose indument found upon most parts of the plants, the peculiar calyx with subulate teeth, and the long and slender peduncles with acute, semi-persistent bracts subtending the rather distant flowers. The description of the fruit is based on the specimens from Siguatepeque, Honduras and, although lacking flowers, are similar to the most typical plants in foliar characters.

Series 5. **ACUMINATAE** J. León, ser. nov.

*Arbor;* ramuli teretes. *Folia* foliolorum paribus 6 minusve; rhachis alata. *Inflorescentiae* 1-aliquot pedunculis longis gracilibus rhachibusque curtissimis. *Flores* congesti globos facientes. *Legumina* plana oblonga acuminata.

*Trees;* branchlets terete, glabrous. *Leaves* with 6 or less pairs of leaflets; leaflets small, narrow, glabrous; rhachis winged; glands patelliform. *Inflorescences* 1-few, with long slender peduncles; rhachis very short. *Flowers* congested, giving a globose appearance; bracts linear, persistent; calyx irregular, cleft on one side, forming a well marked pointed projection. *Legume* flat, oblong, glabrous, acuminate.

Type species: *I. acuminata* Benth.

This series has affinities to the series DENSIFLORAE through *I. tenuipedunculata,* and to some DYSANTHAE (*I. ciliata* and *I. psitacorum*). It is confined to South America, and is formed by few, isolated species. In the area under study only one occurs.

SPECIES . . . 29

29. INGA ACUMINATA Benth. in Hook., Lond. Jour. Bot. **4:** 600, 1845. (Type *Lockhart* 334)

*Feuilleea acuminata* (Benth.) O. Ktze., Rev. Gen. Pl. **1:** 187, 1891.

*Trees* up to 12 m tall; branchlets terete, glabrous, striate, sparsely lenticellate. *Leaves* with 2-4 pairs of leaflets; leaflets coriaceous, narrowly elliptic to lanceolate, often asymmetric, acute to long-acuminate at the apex, the base cuneate, above deep green, glabrous and lustrous, the nerves slightly prominent, beneath paler, punctate, glabrous, the nerves conspicuous, the upper pair 7-12 cm long, 3-4 cm wide, the lower pair 4-5 cm long, 2-3 cm wide; rhachis winged, 2-6 cm long, glabrous, the wings cuneate, up to 1.5 cm wide, the glands sessile, patelliform; petiole winged, 1.0-1.5 cm long, glabrous, the pulvinus terete and thick, about ¼ the total length; stipules ovate, 3-7 mm long, striate, pilose outside, semipersistent. *Inflorescences* solitary, axillary; peduncle slender, 3-7 cm long, striate, pilose; rhachis very short, 0.5-1.0 cm long, giving to the inflorescences a striking umbelliform appearance, the bracts linear-elliptic, 3-9 mm long, pilose, persistent. *Flowers* sessile, or shortly pedicellate; calyx tubular, ungulate at the apex in bud, about half cleft on one side, 9 mm long, sparsely pilose to glabrescent, the teeth obsolete; corolla tubular-funnelform, 11-12 mm long, densely strigose, the lobes

acute, about 2.5 mm long; staminal tube included or very slightly exserted, the filaments 1-2 cm long; ovary flat, glabrous, the style 3 cm long. *Legume* flat, oblong, slightly curved, shortly acuminate at the apex, the base rounded, 9-21 cm long, 2.0-2.5 cm wide, transversely striate, glabrous, the margins slightly elevated; seeds 18-20.

Trinidad. (Lowlands of northern South America, from Peru to Venezuela.)

TRINIDAD: Tabaguite, *Britton, Freeman & Nowell 2575* (GH); without locality, *Bot. Gard. Trin. Herb. 1043* (US), *Chicago Nat. Hist. Mus. Herb. 573834* (F), *Hart s. n.* (US), *Lockhart 334* (K).

A rare species (illustrated in Hooker, Ic. Pl. **13:** *t. 1202,* 1817) noteworthy especially for its calyx, which in bud has a long and curved acumen and which, once open, is perhaps the most irregular in the genus; also striking are the long-acuminate leaves and the congested inflorescence. Its closest ally is *I. urabensis* L. Uribe, of northern Colombia. Another species similar in foliar characters to *I. acuminata* is the little known *I. angustifolia* Willd. of Venezuela.

Series 6. **PILOSULAE** J. León, ser. nov.

*Arbor* mediocris; ramuli pilosi glabrescentesve. *Folia* maga foliolorum paribus paucis sparse flavo-pilosorum; rhachis alata. *Inflorescentiae* pedunculis curtis crassis; calyx confertim flavo-pilosus. *Legumina* plana tomento crasso flavo.

Medium sized *trees;* branchlets pilose to glabrescent. *Leaves* large, with few pairs of leaflets, thin or chartaceous, sparsely yellow-pilose; rhachis winged, the glands thin and stipitate. *Inflorescences* with short, stout peduncles; the flowers congested in a very short rhachis; calyx tubular, deeply cleft, striate, sparsely pilose; corolla tubular, densely yellow-pilose. *Legume* flat, oblong, covered with a yellow, thick tomentum.

Type species: *I. pilosula* (Rich.) Macbride

The PILOSULAE are characterized by large leaves, short peduncles in which the flowers form a congested inflorescence, and densely yellow-pilose legumes. They seem to be intermediate between the previous series and some of the large flowered species of *Inga* such as in the VULPINAE.

A South American group with marginal representatives in Trinidad and Central America.

SPECIES . . . 30-32

a. Leaves with 2 pairs of leaflets; leaflets long-acuminate, peduncle 4-10 cm long. Trinidad ..... 30. I. PILOSULA
aa. Leaves with more than 2 pairs of leaflets; leaflets obtuse or acute at the apex; peduncle 1-4 cm long.
b. Upper leaflets oblong to obovate; peduncle less than 1.5 cm long; corolla 12-16 mm long. Panama ..... 31. I. HAYESII
bb. Upper leaflets elliptic-oblong; peduncle 2-4 cm long; corolla 18-22 mm long. Costa Rica ..... 32. I. VENUSTA

30. INGA PILOSULA (Rich.) Macbride, Publ. Field Mus. Nat. Hist., Bot. Ser., **13:** 41, 1943.

*Mimosa pilosula* Rich., Act. Soc Hist. Nat. Paris **1:** 113, 1792 (Type *Le Blond s.n.* photo)
*Inga quassiaefolia* Willd. in L., Sp. Pl. **4:** 1013, 1806. (Type *Hoffmansegg s.n.* photo)

*I. nitida* Willd., loc. cit. (Type *Hoffmansegg s.n.* photo)
*Mimosa lucida* Vahl, Eclog. **3:** 31, 1807. (ex char.)
*M. quassiaefolia* (Willd.) Poir. in Lam., Encycl. Suppl. **1:** 41, 1810.
*M. nitida* (Willd.) Poir., loc. cit.
*Inga pilosiuscula* (Rich.) Desv., Jour. Bot. **1:** 71, 1816.
*I. setifera* DC., Prodr. **2:** 432, 1825. (Type *Mus. Paris s.n.* photo)
*I. platycarpa* Benth. in Hook., Lond. Jour. Bot. **2:** 142, 1840 (*fide* Bentham). (Type *Schomburgk 534*, not seen)
*I. affinis* Steud., Flora **1843:** 758, 1843. (Type *Hostmann & Kappler 1157*)
*Feuilleea pilosula* (Rich.) O. Ktze., Rev. Gen. Pl. **1:** 186, 1891.
*F. quassiaefolia* (Willd.) O. Ktze., loc. cit.
*F. setifera* (DC.) O. Ktze., loc. cit.

*Trees* 6 to 14 m tall; branchlets terete, striate, dense ferrugineous-pilose or glabrous, lenticellate. *Leaves* large, with 2 pairs of leaflets; leaflets coriaceous to chartaceous, broadly elliptic, asymmetric, the apex markedly acuminate, the acumen about 1 cm long, the base acute to obtuse, oblique, above dark and lustrous, sparsely pilose to glabrous, the nerves impressed, beneath paler, more densely pilose to glabrous, the nerves prominent, the upper pair broadly elliptic, cuneate at the lower half, 14-19 cm long, 7-9 cm wide, the basal pair elliptic-ovate, 9-10 cm long, 6-7 cm wide; rhachis broadly winged, pilose to glabrous, 4-8 cm long, the wings cuneate, the glands crateriform, about 2 mm in diam, glabrous, the apical appendix linear, 4-10 mm long, pilose, caducous; petiole winged above, 0.5-5.5 cm long, pilose to glabrescent, the pulvinus about 1 cm long, thick and darker; stipules linear, 4-10 mm long, pilose, deciduous. *Inflorescences* axillary, 1-2 spikes in each axil; peduncle terete, 4-10 cm long, striate, ferrugineous-pubescent to glabrous; rhachis 1-2 cm long, the bracts linear, 4 mm long, pilose, caducous. *Flowers* sessile, yellow, congested; calyx tubular, cleft on one side, 6-7 mm long, pilose, striate; corolla tubular-funnelform, 12-16 mm long, appressed-pilose, the hairs bright yellow, the lobes acute, 1.5-2.0 mm long; staminal tube included to slightly exserted, the filaments up to 2.5 cm long. *Legume* flat, thin, oblong, 8-17 cm long, 3-4 cm wide, transversely striate, in age glabrate, the margins elevated.

Lowland forests of Trinidad. (Amazonian Peru and Brazil, Venezuela and the Guianas.)

TRINIDAD: Maravaltful, *O. Kuntze 792* (F, US); O'Meara savanna, *Britton & Britton 2507* (US); Providencia, Sta. Cruz, *Broadway 6591* (MO); San Jose, *O. Kuntze 864* (F); Via Valencia, *Broadway 2292* (F, GH, MO, US); WITHOUT LOCALITY, *Trin. Bot. Gard. Herb. 2845* (F).

*Inga pilosula* has attracted the attention of travelers and botanists by its yellow flowers, so unusual in this genus. Its variability is evidenced by the abundant synonymy in which specific epithets referring to the indument are so common as to indicate that the variability is largely to be found in the indument rather than in more stable characters. Some of the Trinidad specimens are glabrous, while the majority of the Venezuelan and Guianan plants are densely pilose. The names *I. nitida* and *I. quassiaefolia* have been used for the Brazilian specimens with glabrous and lustrous leaves. It may be possible that these names represent different species, but at present no important morphological characters seem to permit a separation of species in the material examined.

31. INGA HAYESII Benth., Trans. Linn. Soc. **30:** 617, 1875. (Type *Hayes 62*)

Small *trees*, 3 to 9 m tall; branchlets terete, pilose when young, in age glabrate, lenticellate. *Leaves* with 2-4 pairs of leaflets; leaflets oblong to obovate, the base rounded to acute, often asymmetric, above strigose or sparsely pilose, the nerves prominent or in shallow grooves, beneath densely pilose, the nerves prominent, the upper pair oblong-elliptic to obovate, generally very asymmetric, 7-14 cm long, 3-6 cm wide, the lowermost pair obliquely ovate to elliptic, 4-6 cm long, 2-3 cm wide; rhachis winged, 3-9 cm long, strigose especially along the midnerve, ending in a linear apex (sometimes a terminal leaflet), the wings cuneate, up to 1 cm wide, the glands shortly stipitate, about 1 mm in diam, concave and glabrous at the apex; petiole terete at the pulvinar section, winged or marginate above, 1-2 cm long, pilose; stipules obovate, acute, up to 6 mm long, tomentose without, semipersistent. *Inflorescences* axillary, solitary or clustered, sessile or shortly pedunculate; peduncles terete, up to 1.5 cm long, ferrugineous-strigose; rhachis strigose, 1.5-2.5 cm long, the bracts oblong, about 2 mm long, acute, pubescent outside, caducous. *Flowers* sessile, congested; calyx tubular, generally deeply cleft on one side, 6-11 mm long, dark reddish, striate, pilose at the base, glabrescent, the teeth small, irregular, 1-2 mm long, with tufts of hairs at the tips; corolla tubular-funnelform, 12-16 mm long, densely strigose, the lobes acute, 2-4 mm long; staminal tube included, the filaments up to 3 cm long. *Legume* flat, thick in age, 10 cm long, 1.5 cm wide in a young specimen, densely yellow-strigose.

Lowlands of Panama. (Colombia.)

PANAMA: CANAL ZONE: Balboa, *Correll 12273* (GH); Chivi-Chivi trail, *Maxon & Harvey 6608* (US); Fort Kobe, *Allen 1890* (GH, MO, NY, US); Cocoli, *Riley 122* (US); Miraflores, *P. White 79* (GH, MO, NY); Paraíso, *Hayes 62* (K). PANAMA: Bella Vista, Panama City, *Maxon & Valentine 6931* (F, GH, US), *6946* (F); Matías Hernández, *Pittier 6714* (F, GH, NY, US); Monte Oscuro, *Zetek 3497* (F); Old Panama, *Riley 140* (US); Pacora, *Woodson, Allen & Seibert 759* (MO, NY, US); Panamá, *Sargent 25* in part (US); Pedro González, Perlas Islands, *Allen 2593* (MO).

In *I. hayesii*, as in the Costa Rican *I. venusta*, there is a marked trend towards a short, almost obsolete peduncle accompanied by a reduction of the floral rhachis, which gives a capitate and often sessile appearance to the inflorescences; the calyx is noteworthy also for the reddish color and deeply cleft sides.

32. INGA VENUSTA Standley, Publ. Field Mus. Nat. Hist., Bot. Ser., **18:** 500, 1937. (Type *Brenes 6256*)

*Trees;* branchlets terete, glabrous, densely lenticellate. *Leaves* with 3-4 pairs of leaflets; leaflets coriaceous oblong to lanceolate, asymmetric, obtuse to obtusely acuminate at the apex, the acumen up to 1 cm long, the base obtuse to rounded, above lustrous, glabrous, the nerves slightly impressed, beneath glabrous, the main nerves and reticulate enervation conspicuous, the upper pair elliptic, generally very oblique, 10-18 cm long, 3-4 cm wide, the lower pairs elliptic to lanceolate, 4-13 cm long, 2.0-4.5 cm wide, the petiolules dark, about 1 mm long, pilose; rhachis cuneately winged, 3.5-11.0 cm long, sparsely pilose on the midnerve,

the wings up to 1.5 cm wide, glabrous, the glands stipitate, pertuse at the apex, about 1 mm in diam, the appendix linear, about 12 mm long; petiole winged above, 1.5-6.0 cm long, sparsely pilose to glabrous, the pulvinus terete, about 0.5 cm long. *Inflorescences* axillary or in groups in the terminal branchlets, solitary or 2-3 in each axil; peduncle terete 2.0-2.5 cm long, striate, sparsely pilose; rhachis 0.5-1.0 cm long, the bracts less than 1 mm long, caducous. *Flowers* sessile, congested; calyx cupulate-tubular, deeply cleft on one side, 6-9 mm long, above glabrous and striate, pilose at the base, the teeth very small and irregular; corolla tubular, 18-22 mm long, with a dense, yellow pubescence, the lobes 4 mm long; staminal tube included, the filaments about 1.5 cm long; ovary glabrous. *Legume* unknown.

Wet forests of central Costa Rica.

Vernacular name: *guabo amarillo* (Costa Rica—Brenes).

COSTA RICA: ALAJUELA: La Palma, San Ramón, *Brenes* 6255 (CR, F, IAIAS), *Brenes* 6256 (CR, F, IAIAS).

An endemic and poorly known species; its closest relationship seems to be with *I. hayesii* of the lowlands of Panama. Both have the same type of inflorescence, a short spike with congested rhachis, and similar structure in the deeply cleft calyx. *Inga venusta* differs in the glabrous and more lanceolate leaves.

Series 7. CALOCEPHALAE Benth. in Hook., Lond. Jour. Bot **4:** 609, 1845.

*Trees;* branchlets angulate or terete, densely yellow-hispid when young, glabrate in age. Leaflets large, densely pilose; rhachis winged; stipules large ovate to lanceolate, subpersistent. *Inflorescence* long pedunculate, the bracts well developed, subpersistent. *Flowers* large, sessile; calyx tubular, narrow, more than 15 mm long, glabrescent; corolla tubular, 30-45 mm long, hirsute. *Legume* flat, 25-35 cm long, 4-6 cm wide, densely yellow-pilose.

Series CALOCEPHALAE is here restricted to a group of species centering around *I. fastuosa* Willd. and *I. macrophylla* Willd., of which only two representatives are found in the area under study, *I. mucuna* Walp. & Duchass. from Panama, and *I. venosa* Benth. from Trinidad.

Bentham and Pittier placed in the CALOCEPHALAE several species that in the present treatment are put in different series. They were maintained in the same group with the species mentioned above on the basis that all them have large and subpersistent stipules and bracts, although they are quite distinct in flower and fruit characters.

SPECIES . . . 33-34

a. Stipules ovate, 7-8 mm long; bracts 5-9 mm long; branchlets tomentose; petiole terete or marginate. Panama ..... 33. I. MUCUNA
aa. Stipules lanceolate, about 16 mm long; bracts 10-15 mm long; branchlets long-pilose; petiole winged. Trinidad ..... 34. I. VENOSA

33. INGA MUCUNA Walp. & Duchass. in Walp., Ann. Bot **2:** 456, 1851-52. (Type *Duchassaing 81*)

*Trees* up to 20 m tall; branchlets terete or angulate, densely ferrugineous-pubescent. *Leaves* with 3-4 pairs of leaflets; leaflets ovate, the apex acute to acumi-

nate, the base rounded, sometimes asymmetric, above sparsely pilose, the costa and main nerves prominent and more pubescent, beneath densely pilose, the hairs yellow and curved, the nerves prominent, the upper pair ovate to elliptic-ovate, 13-19 cm long, 7-11 cm wide, the basal pair ovate, 6-12 cm long, 4-5 cm wide; the petiolule short, conic, 2-3 mm long, densely pubescent; rhachis winged, 11-14 cm long, densely tomentose along the midnerve, the wings cuneate, each about 5 mm wide, sparsely pilose, the glands small, umbiliciform, less than 1 mm in diam, glabrous; petiole terete or slightly winged, 1.5-3.5 cm long, densely ferrugineous-pilose, the pulvinus thicker; stipules ovate, 7-8 mm long, 5-8 mm wide, minutely pubescent, apiculate, deciduous. *Inflorescences* solitary or in groups, axillary, long pedunculate; peduncle terete, 4-7 cm long, densely ferrugineous-tomentose; rhachis 3.0-4.5 cm long, the bracts triangular, 5-9 mm long, yellow-pubescent, subpersistent. *Flowers* numerous, sessile; calyx tubular, 17-20 mm long, striate, glabrous except at the tip, the teeth small, acute, about 1 mm long, sericeous; corolla tubular, 40-55 mm long, sparsely sericeous; the lobes acute, slightly spreading, 5 mm long; staminal tube exserted, the filaments up to 4 cm long. *Legume* flat, straight or twisted, 25-33 cm long, 5-6 cm wide, 0.5 cm thick, densely ferrugineous-hirsute, the margins rounded.

Lowlands of Panama.

PANAMA: CANAL ZONE: Balboa, *Standley 27172* (NY, US), *32124* (US); Barro Colorado Island, *Woodworth & Vestal 665* (F). DARIEN: Boca de Cupé, *Allen 882* (MO, NY, US); Sambú River, *Pittier 5525* (NY, US). PANAMA: Panamá, *Duchassaing 81* (GH), *Sargent 25* in part (US).

*Inga mucuna* is the only Central American representative of the series CALOCEPHALAE. Its closest allies are *I. fastuosa* of Venezuela and *I. venosa* endemic to Trinidad. Further collections may prove the independence of the three species or their grouping into one unit.

34. INGA VENOSA Griseb. ex Benth., Trans. Linn. Soc. **30:** 623, 1875. (Type *Sieber distr. Wabra 104*)

*Trees* 10 to 15 m tall; branchlets terete, striate, densely ferrugineous-hirsute, lenticellate. *Leaves* with 3-4 pairs of leaflets; leaflets elliptic to ovate, subchartaceous, the apex acute, obtuse to markedly acuminate, the acumen 3-4 mm long, pilose, the base rounded, unequal, above lustrous, sparsely pilose to glabrescent, the nerves impressed, beneath dull, more densely pilose, the nerves prominent, the upper pair broadly elliptic, 15-22 cm long, 7-9 cm wide, the basal pair ovate, 6-9 cm long, 4-6 cm wide, the petiolule about 2 mm long, densely pilose; rhachis winged, 9-17 cm long, ending in a linear appendix, 12 mm long, pilose, the wings cuneate, each up to 1 cm broad, pilose, the glands stipitate, glabrous and patelliform at the apex; petiole winged, 2.0-2.5 cm long, pilose, the pulvinus about 0.5 cm long, densely ferrugineous-pilose; stipules triangular, long-acuminate, 14-17 mm long, densely pilose to glabrescent, persistent. *Inflorescences* axillary, in groups, peduncle and rhachis ferrugineous-pubescent, the bracts lanceolate, 10-15 mm long, pilose. *Flowers* sessile; calyx tubular, 15-22 mm long, striate, glabrescent, the teeth

acute, 2-3 mm long, pilose at the tips; corolla tubular-funnelform, 32-42 mm long, appressed-pilose to glabrescent, the lobes acute, 4 mm long, densely pilose; staminal tube exserted. *Legume* (*fide* R. O. Williams) flat, oblong, up to 28 cm long, 4 cm wide, densely ferrugineous-hirsute, the margins elevated.

Lowland forests of Trinidad.

TRINIDAD: Talparo, *Britton, Britton & Freeman 2164* (GH); WITHOUT LOCALITY, *Sieber distr. Wabra 104* (GH, MO).

*Inga venosa* belongs to a group of South American species that centers around *I. macrophylla;* it differs from the rest of them in the slender flowers and in this character is closer to the endemic Panamanian *I. mucuna.* It also has been confused with the Venezuelan *I. fastuosa* Willd., which has broader flowers, although in leaves and fruits they seem to be quite similar. This is the only endemic species of *Inga* in Trinidad.

Series 8. **GOLDMANIANAE** J. León, ser. nov.

*Arbor;* ramuli angulati vel teretes. *Folia* magna pilosa; rhachis alata. *Inflorescentiae* pedunculis longis. *Flores* sessiles in alabastro globosi; calyx praesertim magnus dense flavo-pilosus; corolla confertim albosericeus. *Legumina* plana flavo-hirsuta.

*Trees;* branchlets angulate to terete, densely yellow-pilose, or glabrate. *Leaves* large, pilose, with supernumerary glands on the costa of the leaflets; rhachis winged. *Inflorescences* long-pedunculate, the bracts 5-6 mm long, caducous. *Flowers* sessile, spheric in bud; calyx unusually large, 12-17 mm long, 8-12 mm wide, densely yellow-pilose; corolla 25-28 mm long, 10-15 mm wide, densely white-sericeous. *Legume* flat, 20-25 cm long, 4-6 cm wide, yellow-hirsute.

Type species: *I. goldmanii* Pittier.

The only representative of this series is *I. goldmanii* Pittier from Costa Rica and Panama. The most striking character is the flower, which in size could be compared only with that of *I. sessilis* Benth. of southern Brazil. *Inga goldmanii* does not seem to have any close ally among the species of *Inga* that I have studied from Central and South America.

SPECIES . . . 35

35. INGA GOLDMANII Pittier, Contr. U. S. Nat. Herb. **18:** 198, 1916.—Fig 4. (Type *Goldman 1866*)

Large *trees* up to 20 m tall; branchlets terete, striate, densely ferrugineous-hirsute, sparsely lenticellate. *Leaves* with 3-5 (generally 4) pairs of leaflets; leaflets elliptic to ovate, acute to acuminate at the apex, the acumen linear, up to 6 mm long, the base cordate to rounded, generally asymmetric, above lustrous, sparsely pilose to glabrous, the costa and lateral nerves impressed and more pubescent, the former with a gland at less than 2 cm from the rhachis, beneath pilose, scabrous, the nerves prominent and more pilose, the upper pair elliptic, 18-25 cm long, 7-14 cm wide, the intermediate pairs ovate to elliptic-ovate, 9-15 cm long, 5-8 cm wide, the lowermost pair ovate, 5-9 cm long, 3-6 cm wide, the peti-

olules short, conic, 2 mm long, pubescent to glabrous; rhachis winged, 14-25 cm long, densely hirsute, the wings broader in the upper interfoliolar sections, elliptic, each side up to 11 mm wide, sparsely pilose, the terminal appendage linear, 6-9 mm long, tomentose, the glands long and slenderly pedicellate, 4 mm long, glabrous; petiole winged above, 1.5-4.0 cm long, ferrugineous-hirsute, the pulvinar section thicker and terete; stipules cordate, obtuse, up to 12 mm long and 20 mm wide, pilose, deciduous. *Inflorescences* axillary, generally solitary; peduncle stout, 4-8 cm long, densely ferrugineous-hirsute; rhachis 4-7 cm long, the bracts cordate, 6 mm long, densely tomentose, caducous. *Flowers* unusually large, sessile, distant, spherical in bud; calyx campanulate, 12-17 mm long, 8-12 mm wide, densely yellow-pilose, the teeth obtuse, 4-6 mm long; corolla tubular-campanulate, 25-28 mm long, 10-15 mm wide, densely white-sericeous; staminal tube included, the filaments up to 45 mm long. *Legume* flat, oblong, straight or curved, twisting in age, up to 25 cm long, 6 cm wide, 1 cm thick, densely ferrugineous-hirsute, the margins rounded.

Rain forests of the Atlantic watershed in Costa Rica and Panama.

Costa Rica: alajuela: Los Chiles, *Holm & Iltis 951* (MO). limon: Banana River near Limón, *Cook & Doyle 429* (US); Limón, *Lankester 172* (K); Livingston on the Reventazón River, *Rowlee & Stork 788* (NY, US); Río Hondo, *Pittier 16376* (CR, US); Shirores, Talamanca, *Tonduz 9358* (CR, US).

Panama: bocas del toro: Cricamola, Almirante, *G. P. Cooper 527* (F). canal zone: Barro Colorado Island, *Avilés 68* (F), *Bailey & Bailey 223* (F), *Bangham 392* (F), *396* (F), *Killip 40021* (MO, US), *Shattuck 514* (F), *584* (F), *Standley 40999* (US), *Starry 231* (F), *Wetmore & Abbe 15* (F, GH), *15a* (F), *Woodworth & Vestal 321* (F), *Zetek 3461* (F), *3462* (F); Frijoles, *Allen 922* (GH, MO); Gatún, *Goldman 1866* (US); Lion Hill Station, *Hayes 598* (US); Monkey Hill, *Lehmann 1001* (US); Salamanca, *Steyermark & Allen 16754* (GH); without locality, *Epplesheimer s. n.* (F).

This species, without any apparent affinity, is one of the most striking *Leguminosae* of Central America. It grows in the rain forest where it attains the level of the highest trees. Especially noteworthy are the large flowers surpassed in size in this genus only by *I. sessilis* Benth. of southern Brazil. Another rare character is the foliolar glands, more conspicuous in the seedlings and young leaflets, paralleled only in *I. adenophylla* Pittier and *I. pruriens Poepp.*, both of the upper Amazon.

Series 9. dysanthae Benth., Trans. Linn. Soc. **30:** 625, 1875.

*Trees;* branchlets terete, ferrugineous-pilose. *Leaves* large; leaflets glabrous and sublustrous above, densely and softly pilose beneath; rhachis terete (generally winged in the South American species). *Inflorescence* pedunculate, the bracts small, caducous. *Flowers* distant; calyx cupular-shaped, 4-5 mm long, lanose; corolla up to 18 mm long, lanose, pinkish. *Legume* flat, densely pilose.

species . . . 36

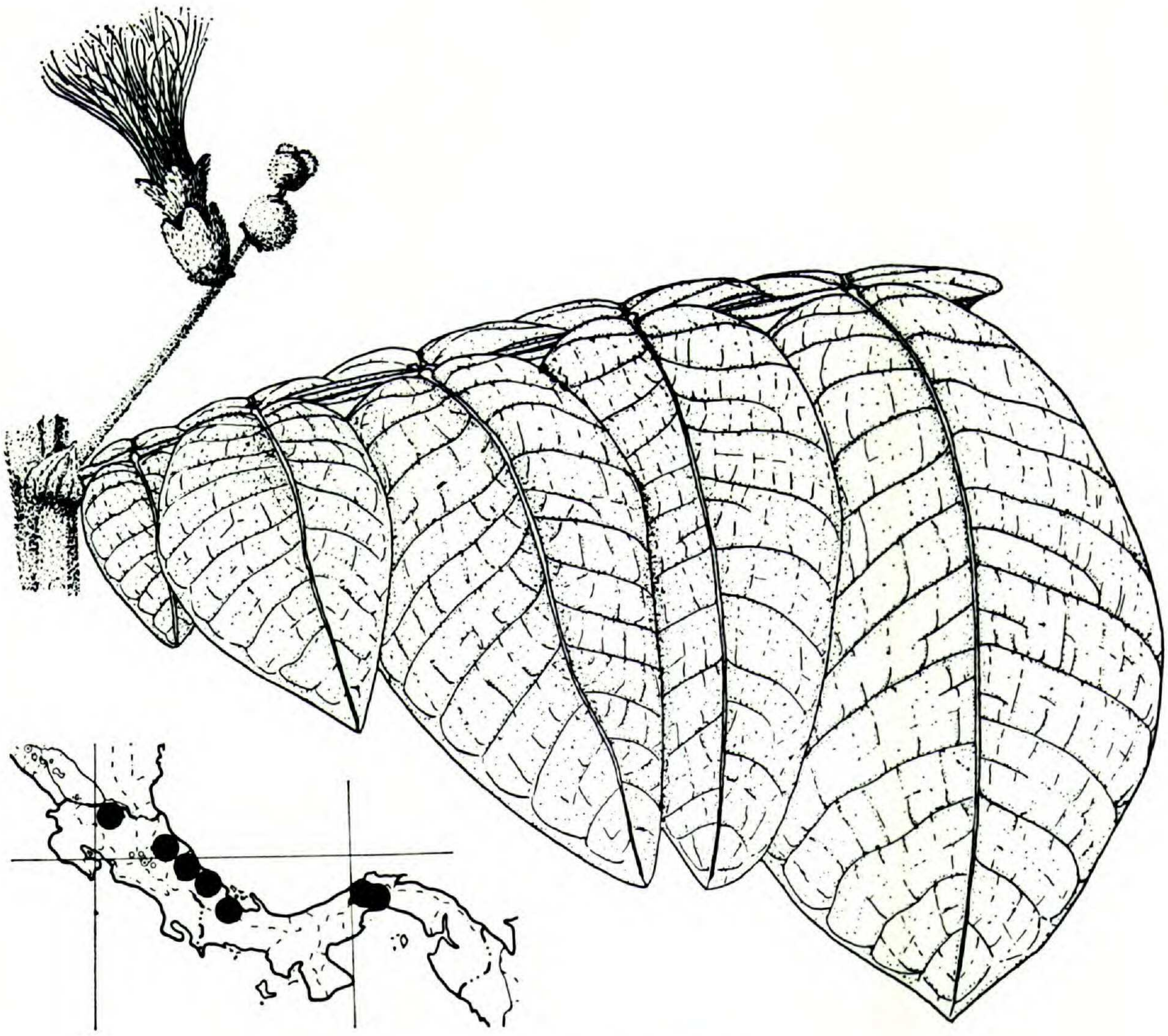


Fig. 4. *Inga goldmanii* Pittier

36. INGA STANDLEYANA Pittier, Contr. U. S. Nat. Herb. **18:** 204, 1916. (Type *Pittier 5496*)

Low *trees;* branchlets terete, densely ferrugineous-pilose. *Leaves* with 4 pairs of leaflets; leaflets obovate to elliptic, subchartaceous, the apex obtuse to markedly apiculate, the base obtuse to rounded or subemarginate, above opaque, sparsely pilose to glabrescent, closely pilose on the depressed nerves and margins, beneath paler, densely yellow-pilose, the 11-14 lateral nerves very prominent, the reticulate nervation conspicuous, the upper pair rhombic-ovate to elliptic, oblique and cuneate at the base, 11.0-13.5 cm long, 7.5-8.0 cm wide, the lower pair elliptic to ovate, 6-7 cm long, 4.0-4.5 cm wide, the petiolules conic, about 1.5 mm long, densely pilose; rhachis terete, 3.0-3.5 cm long, ferrugineous-pubescent; stipules triangular, 2 mm long, pilose, caducous. *Inflorescences* axillary or terminal, solitary or paired; peduncle terete, 1.5-4.0 cm long, striate, ferrugineous pilose; rhachis 4.5-6.0 cm long, the bracts ovate, caducous. *Flowers* distant, sessile, soon deciduous; calyx cupular-shaped, 4-5 mm long, densely lanose, the teeth shallow, about 1 mm long, corolla broad, funnelform, 15-18 mm long, lanose, the lobes broad, obtuse, 3-4 mm long; staminal tube included to slightly exserted, pinkish, the

filaments about 2.5 cm long; ovary lanose. *Legume* (*fide* Pittier) flat, densely ferrugineous-pilose.

Rain-forests of western Panama.

PANAMA: DARIEN: vic of La Palma, *Pittier 5496* (GH, US).

An endemic species regarded by some authors as close to *I. dysantha* Benth. (Type *Spruce 1816*) but easy to separate because of its unwinged rhachis and the size of its flowers. The closest ally, however, is *I. rubiginosa* DC. placed by Bentham and Pittier in EUINGA-SULCATAE, probably on the slight similarity in foliage characters. *Inga rubiginosa* is quite a variable species; it has, like *I. standleyana*, a terete rhachis and a very similar type of leaves. The flowers are larger and more slender than in the Panamanian plants. *Inga standleyana* is the only member of the series DYSANTHAE in North America.

Series 10. **SPECTABILES** J. León, ser. nov.

*Arbor*; ramuli angulati, glabrescens. *Folia* magna, glabrescens; rhachis teretia vel alata. *Inflorescentiae* pedunculis brevis, bracteis magnis. *Flores* sessiles congesti. *Legumina* plana, glabrata.

Large *trees;* branchlets angulate, glabrescent. *Leaves* large; leaflets chartaceous, glabrous or sparsely pilose; rhachis terete, subalate or winged; stipules linear-lanceolate, 6-9 mm long, subpersistent. *Inflorescences* shortly pedunculate; bracts large, tomentose, subpersistent. *Flowers* sessile, clustered; calyx cleft to one side, 8-9 mm long, densely pubescent; corolla tubular, 18-24 mm long, tomentose. *Legume* flat, 30-70 cm long, 4-8 cm wide, glabrous.

Type species: *I. spectabilis* (Vahl) Willd.

This series corresponds to SPECTABILES, rank unspecified, Britton & Killip, Ann. N.Y. Acad. Sci. **35:** 111, 1936, a nomen nudum, and in part to SPECTABILES, Gutiérrez, Rev. Fac. Nac. Agr. Col. **7:** 53, 1947, also a nomen nudum.

*Inga spectabilis* Willd. is the only member of this series that occurs in Central America. Several other species have been described from northern South America.

SPECIES . . . 37

37. INGA SPECTABILIS (Vahl) Willd. in L., Sp. Pl. **4:** 1017, 1806. (ex char.)

*Mimosa spectabilis* Vahl, Skr. Nat. Selsk. Kjob. **21:** 219, *pl. 10*, 1792.
*Inga fulgens* Kunth, Mim. 36, *pl. 11*, 1819. (ex char.)
*I. lucida* H.B.K., Nov. Gen. Sp. Pl. **6:** 287, 1824. (ex char.)
*Feuilleea spectabilis* (Vahl) O. Ktze., Rev. Gen. Pl. **1:** 184, 1891.
*Inga smithii* Britton ex Britton & Killip, Ann. N. Y. Acad. Sci. **35:** 117, 1936. (Type *Killip & Smith 14923*)

*Trees* up to 12 m tall, the crown spreading; branchlets angulate, glabrescent, lenticellate. *Leaves* large, with 2-3 pairs of leaflets; leaflets elliptic to obovate, coriaceous, the apex rounded to mucronate, the base asymmetric, obtuse to cordate, above dark green, lustrous and glabrescent, the nerves deeply impressed and sparsely pilose, beneath paler, sparsely pilose, the nerves very prominent, more densely pilose, the upper pair 19-28 cm long, 8-15 cm wide, the basal pair 10-16 cm long, 5-9 cm wide, the petiolules conic, 3-5 mm long, pilose; rhachis terete to winged, up to 11 cm long, pubescent or lenticellate, the wings cuneate, broader above, each obsolete to 12 mm wide, the glands short, patelliform, 2-3 mm in

diam; petiole stout, subterete, sometimes winged above, 6-15 mm long, puberulent; stipules linear to lanceolate, acute, 6-9 mm long, about 4 mm wide, subpersistent. *Inflorescences* 2-6 in terminal panicles, or solitary and axillary; peduncles angulate, 3-8 cm long, striate, puberulent; rhachis 1-5 cm long, the lower bracts cordate, 8-14 mm long, 6-11 mm wide, tomentose and subpersistent, the upper bracts elliptic, 8-10 mm long, 3-5 mm wide, densely tomentose. *Flowers* congested, sessile; calyx tubular, cleft to one side, 8-9 mm long, densely pubescent, the teeth spreading, about 3 mm long; corolla tubular, 18-24 mm long, tomentose, the lobes spreading; staminal tube slightly exserted, the filaments up to 4 cm long. *Legume* flat, oblong, woody, straight or slightly curved, up to 70 cm long, 8 cm wide and 3 cm thick, glabrous, the margins not elevated; seeds numerous, surrounded by scanty aril.

Mexico; southern Central America. (Colombia and Venezuela).

Vernacular names: *guabo machete* (Costa Rica); *guabo real* (Panama).

MEXICO: OAXACA: Ubero, *Ll. Williams 9277* (F), *9386* (F).

COSTA RICA: ALAJUELA: Guatuso, *Holm & Iltis 834* (MO); Muelle de San Carlos, *León 2426* (IAIAS). PUNTARENAS: Boruca, *Tonduz 4765* (CR); Buenos Aires, *Tonduz 3826* (CR). SAN JOSE: El General, *Skutch 2727* (GH, MO, NY, US).

PANAMA: BARU: Progreso, *Cooper & Slater 203* (F, NY, US). BOCAS DEL TORO: Changuinola Valley, *Cooper & Slater 124* (US); Fish Creek, *von Wedel 2392* (GH, US). CANAL ZONE: Ancón, *Maxon s. n.* (US); Balboa, *Standley 29243* (US); Barro Colorado Island, *Avilés 925* (F), *Bailey & Bailey 293* (F), *409* (F), *Kenoyer 370* (US), *Zetek 3481* (F), *3489* (F), *3669* (F); Culebra, *Pittier 2423* (GH, NY, US); Las Cascadas, *Pittier 3476* (US). CHIRIQUI: San Félix to Cerro Flor, *Allen 1944* (GH, MO, US). COCLE: Bismarck, Penonomé, *R. S. Williams 383* (NY), *584* (NY). PANAMA: Juan Díaz, *Standley 30571* (US); Las Sabanas, *Bro. Paul 139* (US); Río Tapia, *Standley 28147* (US); Taboga Island, *Maxon 6922* (GH, US). WITHOUT LOCALITY: *Kuntze 1923* (NY).

*Inga spectabilis* is a striking tree when loaded with the long, pendant fruits. It is planted commonly around the Indian dwellings for its fruits and as a shade tree in the pastures of the lowlands. The specimens examined, as well as many from Colombia and Venezuela, show rather restricted variability. *Inga smithii* is based on a young specimen more densely pubescent than the adult plants. The Mexican specimens, known only in fruit, show a remarkable discontinuity and, although their foliage and legumes are similar to the southern plants, only more collections will prove the correctness of this relationship.

An incomplete specimen from Guatemala, *Pittier 1911: 200*, also may belong to this species.

Series 11. VULPINAE Benth. in Hook., Lond. Jour. Bot. **4:** 604, 1845.

*Trees;* branchlets angulate to terete, densely yellow-pilose when young, in age glabrate. *Leaves* large; folioles pilose, acuminate; rhachis winged, the glands slenderly pedicellate; stipules ovate, pilose, persistent. *Inflorescences* shortly peduncuate; bracts long, acute, persistent. *Flowers* sessile; calyx tubular, less than 5 mm wide, glabrescent; corolla tubular, densely pilose. *Legume* flat, thin, densely yellow-pilose.

This series is formed by few species, many of them restricted to the southern limit of the genus. Among them the most typical are *I. vulpina* Mart. and *I. hirsutissima* Rusby, the latter quite close to the Central American *I. tonduzii* J. D. Smith.

SPECIES . . . 38

38. INGA TONDUZII J. D. Smith, Bot. Gaz. **44:** 112, 1907.—Fig 5. (Type *Tonduz 12928*)

*Trees* up to 12 m tall; branchlets terete, the young one aristate, hirsute. *Leaves* with 2, generally 3-4 pairs of leaflets; leaflets elliptic to cordate, the apex long-acuminate, the acumen filiform and densely pilose, the base acute to cordate, oblique, above densely yellow-pilose, especially on the costa and margin, or glabrescent and lustrous, the nerves impressed, beneath even and densely pilose, the nerves prominent, the upper pair elliptic to obvate, 11-16 cm long, 5-7 cm wide, the intermediate lanceolate, the basal pair cordate, 2.5-4.0 cm long, 1.5-2.0 cm wide, the petiolules less than 1 mm long, densely ferrugineous-pilose; rhachis winged, 2-9 cm long, closely pilose along the midrib, the wings elliptic, each about 4 mm wide, sparsely pilose, the acumen linear, up to 15 mm long, pilose, the glands clearly stipitate, 4 mm long, glabrous; petiole short, slightly winged, 1.0-1.5 cm long, pilose; stipules triangular, cordate, acuminate, 15-20 mm long, pubescent, persistent. *Inflorescences* axillary, solitary or 2-3; peduncle terete, 1-2 cm long, densely pilose; rhachis 1-4 cm long, the bracteoles lanceolate, 15-18 mm long, persistent. *Flowers* congested, sessile; calyx tubular, 10-16 mm long, striate, pilose to glabrescent, the teeth acute, 3-6 mm long, pilose; corolla tubular, deeply lobed, 20-27 mm long, yellow-sericeous, the lobes acute, 4-9 mm long; staminal tube included. *Legume* flat, oblong, apiculate, 15-30 cm long, 4-5 cm wide, 0.5 cm thick, densely fulvous-pilose to glabrous in age, the margins elevated.

Highlands of central Costa Rica, 600-1400 m elevation.

Vernacular name: *guabo amarillo, guabo peludo* (Costa Rica).

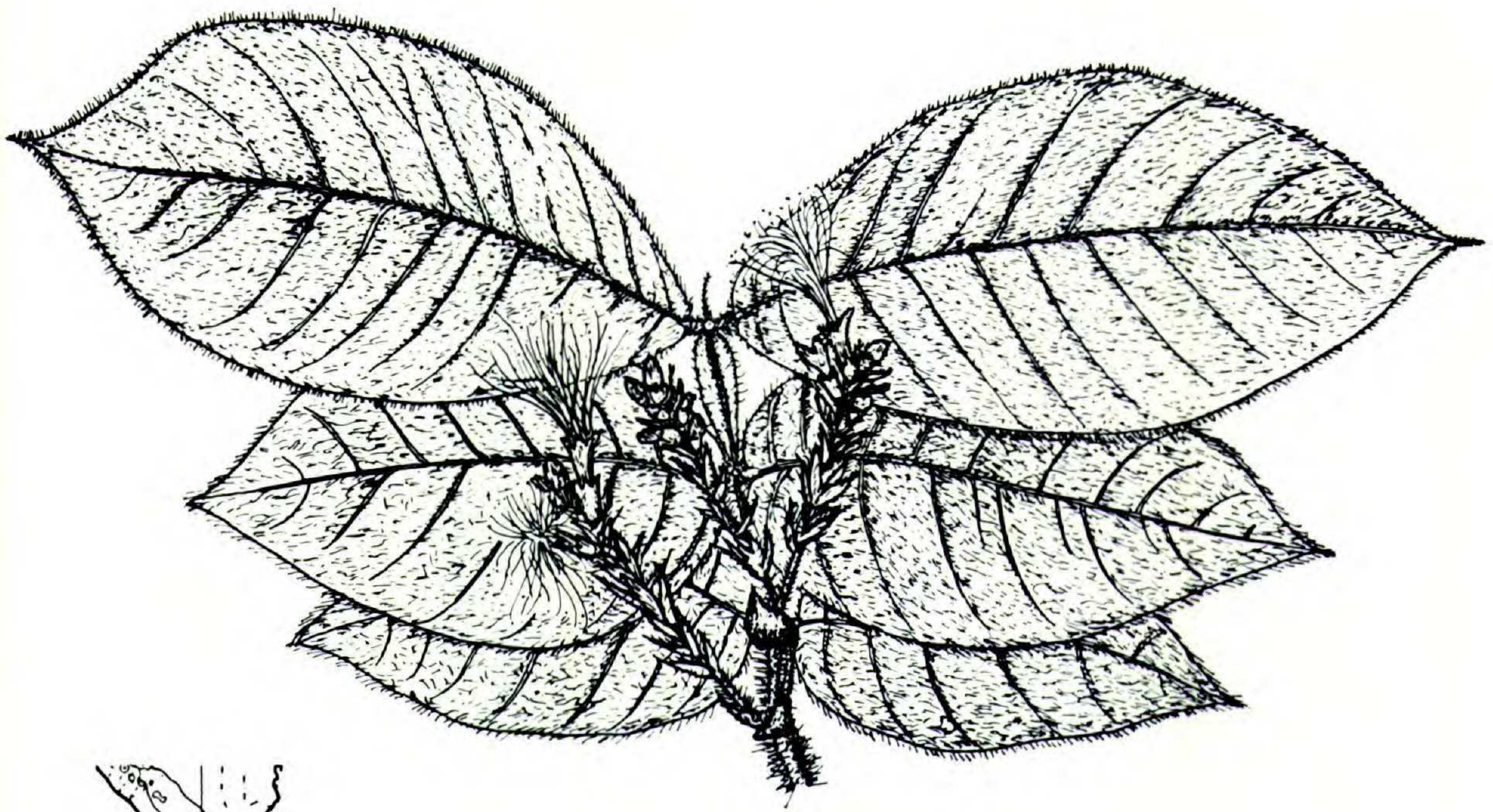
COSTA RICA: ALAJUELA: La Palma, San Ramón, *Brenes 6268* (CR, F), *6820* (CR, F), *17163* (CR, F); Zapote, San Carlos, *A. Smith 1307* (F, NY), *2655* (MO). CARTAGO: Cartago, *Torres 98* (F); Las Vueltas, Tucurrique, *Tonduz 12928* (GH, US); Orosi, *Pittier s. n.* (NY); Turrialba, *Córdoba 34* (IAIAS), *97* (IAIAS), *León 3921* (MO, IAIAS). SAN JOSE: La Palma. *Standley 38076* (US).

*Inga tonduzii* is especially noteworthy for its short and pilose inflorescences congested in the axils of the leaves and its large pilose fruits. It is often seen in the coffee groves, among other common species, although its size and slow growth make it unsuitable as a shade tree.

Series 12. TETRAGONAE Pittier, Contr. U. S. Nat. Herb. **18:** 205, 1916.

*Trees*; branchlets terete to angulate, sparsely pilose to glabrous. *Leaves* large, the folioles sparsely pubescent to almost glabrous; rhachis winged to marginate or terete, the glands small and cupuliform; stipules ovate, sparsely pilose, persistent. *Inflorescences* shortly pedunculate, the bracts persistent. *Flowers* sessile; calyx tubular, striate, shortly pilose; corolla tubular-funnelform, white-sericeous. *Legume* tetragonal, the margins as wide as the valves, ridged, the valves flat with prominent borders.

SPECIES . . . 39



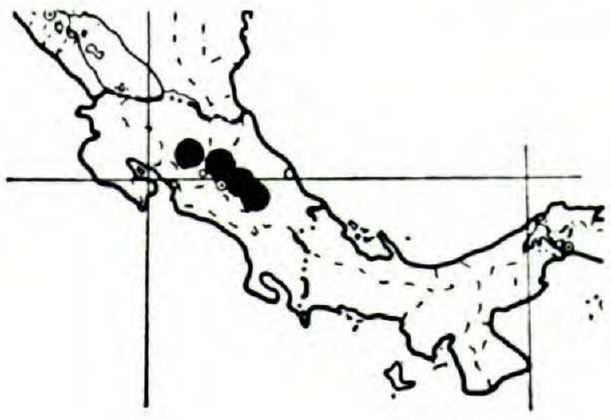


Fig. 5. *Inga tonduzii* J. D. Smith

39. INGA SAPINDOIDES Willd. in L., Sp. Pl. **4:** 1012, 1806. (Type *Bredemeyer s.n.*)

*I. lindeniana* Benth. in Hook., Lond. Jour. Bot. **4:** 608, 1845. (Type *Linden 726*)
*I. panamensis* Seem., Bot. Voy. Herald 117, 1853. (Type *Seemann 407*)
*Feuilleea sapindoides* (Willd.) O. Ktze., Rev. Gen. **1:** 189, 1891.
*F. lindeniana* (Benth.) O. Ktze., loc. cit. 188.
*F. panamensis* (Seem.) O. Ktze., loc cit.
*Inga pittieri* Micheli, Bull. Herb. Boiss. **2:** 466, 1894. (Type *Tonduz 4977*)
*I. hartii* Urb., Symb. Ant. **1:** 311, 1899. (Type *Hart 845*)
*I. eggersii* Harms in Engl., Bot. Jahrb. **42:** 88, 1908. (Type *Eggers 15075*)
*I. preussii* Harms in Fedde, Rep. Sp. Nov. **13:** 420, 1914 (Type *Preuss 1386* photo)
*I. purpusii* Pittier, Contr. U. S. Nat. Herb. **18:** 199, 1916. (Type *Purpus 6811*)
*I. biolleyana* Pittier, loc. cit. 207. (Type *Tonduz 8391*)
*I. jimeneziana* Pittier, loc. cit. 208. (Type *Tonduz 8333*)
*I. rensoni* Pittier, loc. cit. 209, 1916. (Type *Renson 239*)
*I. rodrigueziana* Pittier, loc. cit. (Type *Heyde & Lux 6095*)
*I. salvadorensis* Britton & Rose, N. Amer. Flora **23:** 12, 1928. (Type *Calderón 1828*)
*I. caracasana* Pittier, Trab. Mus. Com. Venez. 263, 1929. (Type *Pittier 9859*)
*I. grandifolia* Pittier, loc. cit. 264 (Type *Pittier 12621*)
*I. camuriensis* Pittier, loc. cit. 266 (Type *Pittier 13040*)
*I. antioquensis* Britton & Killip, Ann. N. Y. Acad. Sci. **35:** 118, 1936. (Type *Toro 858*)
*I. chardonii* Britton & Killip, loc. cit. 121. (Type *Chardon 135*)
*I. panamensis* Seem. var. *pittieri* (Micheli) Schery, Ann. Missouri Bot. Gard. **37:** 203, 1950.
*I. panamensis* Seem. var. *clavata* Schery, loc. cit. 204. (Type *von Wedel 672*)
*I. panamensis* Seem. var. *rodrigueziana* (Pittier) Schery, loc. cit. 205.
*I. alotopetiola* Schery, loc. cit. 206. (Type *Cooper & Slater 65*)

*Trees* 6 to 15 m tall; branchlets terete, on the new growth with a short and ferrugineous pubescence, in age glabrate and densely lenticellate. *Leaves* with 2-5 (generally 3-4) pairs of leaflets; leaflets chartaceous to membranaceous, broadly elliptic to lanceolate, the apex obtuse to acute, or shortly and abruptly acuminate, the base acute to rounded, often emarginate, above bright green, yellow-tomentose or scabrous to completely glabrous, the costa prominent and more pubescent, the lateral nerves ascending, slightly prominent to sunken, beneath paler, densely tomentose to glabrescent, the costa and lateral nerves prominent, the tertiary nervation transverse and conspicuous, the upper pair elliptic to obovate, strongly cuneate towards the base, often oblique, 9-20 cm long, 5-8 cm wide, the lower pair lanceolate, 5-12 cm long, 3-6 cm wide, the petiolules short and thick, 1-3 mm long, densely pilose; rhachis commonly winged only in the upper interfoliolar sections, or terete, 7-19 cm long, the wings elliptic or cuneate, the midrib prominent, densely pilose to glabrous, the glands obsolete to markedly pedicellate, crateriform to patelliform, 1-2 mm in diam, glabrous, with a wide and shallow pore, the terminal appendix linear-lanceolate, 5-8 mm long, pilose, caducous; petiole terete or marginate, 2-4 cm long, pubescent to glabrate; stipules ovate to lanceolate, up to 10 mm long, 8 mm wide, striate, densely pilose to glabrescent, persistent. *Inflorescences* 1-3, generally lateral from defoliated nodes and subtended by a pair of stipules, rarely terminal; peduncle terete, stout, 1-6 cm long, striate, pilose; rhachis 1-3 cm long, the bracts oblanceolate to spathulate, 8-15 mm long, striate, pilose; rhachis 1-3 cm long, the bracts oblanceolate to spathulate, 8-15 mm long, tomentose, persistent. *Flowers* sessile, distant or congested; calyx tubular, 9-17 mm long, striate, sparsely greenish-pilose to glabrate, the teeth acute to subulate, often irregular, 4-6 mm long, densely pilose; corolla tubular, dilating above, 18-30 mm long, appressed-pilose, the lobes 3-4 mm long; staminal tube included, the filaments about 4-5 cm long; ovary oblongoid, sulcate, the style 4-6 cm long, the stigma discoid. *Legume* tetragonal, 11-30 cm long, glabrous or sparsely pilose, the apex ending in a short and acute acumen, the base rounded, the margins 1.5-2.5 cm wide, with longitudinal ridges and flaring borders, the valves 2-3 cm wide, flat, concave when young, at maturity convex; seeds 16-24, oblong, surrounded by a thin aril.

Mexico (Oaxaca) to Panama; Trinidad and Tobago. (South America.)

Vernacular names: *tama-tama* (British Honduras—Gentle); *cushin* (Guatemala—Steyermark); *shalum* (Guatemala—Standley); *cuajiniquil* (Salvador—Standley); *guabo cuabrado* (Costa Rica).

MEXICO: CHIAPAS: Finca Yolanda, *C. A. Purpus 6811* (F, GH, MO). OAXACA: Ubero, *Ll. Williams 9136* (F). TABASCO: Teapa, *Linden 726* (K).

BRITISH HONDURAS: Camp 6, Vaca Road, *Lundell 6544* (GH, NY); El Dorado, *Schipp 387* (F); Gracie Rock, Sibun River, *Gentle 1729* (MO, NY); Middlessex, *Hope 1* (F), *Schipp 294* (F, GH, MO, NY, US); Stann Creek, *Burns 11* (F, US); without locality, *Peck 511* (GH).

GUATEMALA: ALTA VERAPAZ: Chamá, *Johnson 892* (US); Gubilgüitz, *Tuerckheim 7855* (US); Sepacuité *Cook & Griggs 13* (US), *631* (US), *706* (US); Yalpemech, *Steyermark 45212* (F). CHIMALTENANGO: Sibajá, *Standley 62555* (F). ESCUINTLA: Pacayal, Santa Emilia, *Bequaert 13* (F, GH). GUATEMALA: Amatitlán, *Popenoe 707* (US); Guarda Viejo, *Kellermann 4397* (US); San Raimundo, *Standley 63036* (F). IZABAL: Los Andes to Entre Ríos,

*Record 47* (US); Motagua Valley, *Record & Kuylen 70* (NY, US); Quiriguá, *Standley 24013* (GH, NY, US); Sto. Tomas, Escobas, *Steyermark 39218* (F). JALAPA: El Rancho, *Kellerman 7670* (F, NY). QUEZALTENANGO: Colomba to Asintal, *Standley 87889* (F); Santa María de Jesús to Calahuaché, *Steyermark 33851* (F). RETALHULEU: Retalhuleu, *Standley 88697* (F); Río Samalá, *Shannon 557* (US); San Felipe, *Holway 719* (US). SACATEPEQUEZ: Barranco Hondo, *Standley 60269* (F). SANTA ROSA: Las Viñas, *Heyde & Lux 6095* (F, GH, US). WITHOUT LOCALITY: *Lewton 378* (US).

SALVADOR: LA LIBERTAD: Sta. Tecla, *Levy 785* (EAP), *Williams & Molina s. n.* (F). SAN SALVADOR: San Salvador, *Calderón 117* (GH, US), *171* (GH, NY, US), *1454* (GH, US), *1828* (NY), *Preuss 1386* (photo) (GH, MO), *Renson 239* (US), *Standley 19109* (GH, MO, US), *19198* (GH, US), *20560* (GH, US), *23088* (GH, NY, US), *23641* (GH, NY, US). SAN VICENTE: Apastepeque, *Standley 21342* (GH, US). SONSONATE: Armenia, *Standley 23462* (GH, US); Izalco, *Pittier 1974* (US), *Standley 21803* (GH, US). WITHOUT LOCALITY: *Calderón 2591* (F); *Carlson s. n.* (F).

HONDURAS: ATLANTIDA: La Ceiba, *Yuncker, Koepper & Wagner 8569* (F, GH, NY, US); Tela, *Standley 56845* (F, NY, US). MORAZAN: Montaña Zanquín, *Molina 2980* (F).

NICARAGUA: CARAZO: Diriamba, *Greenman & Greenman 5825* (MO); Jinotepe, *Standley 8449* (F). GRANADA: Volcán Mombacho, *Baker 135* (GH, MO, NY). ZELAYA: Braggman's Bluff, San Antonio, *Englesing 159* (F).

COSTA RICA: ALAJUELA: Nuestro Amo, *Inst. Phys-geogr. C. R. 16915* (K, US); San Ramón, *Brenes 13507* (CR, F, IAIAS); Villa Quesada, *A. Smith 1612* (EAP, F), *1891* (EAP, F, NY). CARTAGO: Juan Viñas, *Cook & Dolye 389* (US); La Gloria, *Pittier 16364* (US); Las Vueltas, Tucurrique, *Tonduz 13055* (GH, NY, US); Río Colorado, Turrialba, *Tonduz 8333* (CR); Turrialba, *León 3922* (IAIAS), *Pittier 9041* (CR, US), *Tonduz 8391* (CR, US). GUANACASTE: Tilarán, La Tejona, *Standley & Valerio 45784* (NY, US). HEREDIA: Heredia, *León 1497* (IAIAS); La Bermúdez. *León 3900* (IAIAS); San Francisco, *León 3812* (IAIAS); San Pablo, *León 3934* (IAIAS); Santo Domingo, *Escheverría 317* (F) *318* (F). LIMON: Cairo, Monte Cristo, *Standley & Valerio 48539* (US). PUNTARENAS: Palmar Norte, *Allen 5785* (EAP, F); Río Ceibo, *Tonduz 4977* (CR); Sto Domingo, Golfo Dulce, *Tonduz 10030* (CR, F, GH, NY, US). SAN JOSE: San Francisco, Guadalupe, *Tonduz 17957* (F, GH, NY, US). WITHOUT LOCALITY: *Inst. Phys-geogr. C. R. 16916* (US).

PANAMA: BOCAS DEL TORO: Almirante region, *Cooper & Slater 65* (US); Changuinola, *Cooper & Slater 108* (F, NY, US), *Dunlap 523* (F, US); Water Valley, *von Wedel 672* (GH, MO), *849* (GH, MO, US), *1822* (MO), *2749* (GH, MO, US). CANAL ZONE: Barro Colorado Island, *Avilés 22* (F), *Bailey & Bailey 410* (F), *Chickering s. n.* (F), *Kenoyer 368* (US), *Killip 40017* (MO, US), *Shattuck 273* (F), *743* (F), *Standley 40992* (US), *Wetmore & Abbe 34* (F, GH), *C. L. Wilson 71* (F), *Woodworth & Vestal 329* (F), *374* (F), *737* (F), *Zetek 3458* (F), *3668* (F), *4398* (F, MO); Darién Station, *Standley 31610* (US); Empire to Mandinga, *Piper 5112* (US); Las Cruces, *Seemann 407* (GH); Quebrada La Palma, *Dodge & Allen 17340* (F, GH, MO, US); Summit, *Harvey 5180* (F). CHIRIQUI: San Félix, *Pittier 5452* (US). COCLE: Bismarck, above Penonomé, *R. S. Williams 489* (NY). DARIEN: Cituro, *R. S. Williams 673* (NY).

TRINIDAD: without locality, *Ex. Herb. Trin. Bot. Gard. 845* (F), *Hart 895* (F).

TOBAGO: Craig Hall, *Broadway 4355* (F).

The long synonymy of *I. sapindoides* is more the result of detailed work on unstable characters than the existence of determinable variants. In fact no clear-cut entities could be delimited in the available material, and it seems that perhaps the best rank for some of them is a varietal status, as assigned to certain variants by Schery (Ann Missouri Bot. Gard. **37:** 188-225, 1950).

In the whole range of variation some trends may be detected although they lack a firm geographic correlation; the plants of Mexico, Guatemala and Salvador are in general more hairy, while those in Panama, northern South America and Trinidad are often quite glabrous; the length of the calyx and shape of the leaflets are highly variable in the same specimen. A considerable work on the fruit characters shows that certain areas in Costa Rica offer as much variability as

the whole range. The cultivated plants, on the other hand, show a remarkable uniformity, but they may come from a reduced number of progenies.

The most outstanding variant in the area occurs in the Atlantic side of Nicaragua, Costa Rica and Panama, and has been called *I. biolleyana* and *I. panamensis* var. *clavata;* its main characters are the narrowly winged to terete foliar rhachises, the obovate leaflets and elongate corollas. Transitional stages towards other types are frequent and at present it seems scarcely more than a variety.

It is noteworthy to observe that the different synonyms of this species, enumerated above, fall under three different series in the revisions of Pittier. This is partially due to a lack of correlation between the fruit and floral characters, and perhaps also to the poor preservation of some specimens. In résumé it seems more appropriate, until field studies could clarify the validity of the entities, to consider *I. sapindoides* a highly variable species than to accord specific status for the numerous segregates, in which case scores of new species should yet be described based on comparable variants.

*Inga sapindoides* is often planted as a shade tree in the coffee-growing areas; it has a broad spreading crown, large and well dispersed leaves, and its size is quite favorable to pruning. Its fruits are of rather low quality.

## Series 13: INGA

Ser. *Sulcatae* Pittier, Contr. U. S. Nat. Herb. **18:** 210, 1916.

*Trees;* branchlets terete or angulate, pilose to glabrate. *Leaves* large, pilose, the rhachis terete or winged, the glands crateriform. *Flowers* small to medium size; calyx tubular, pubescent; corolla tubular, appressed-pilose. *Fruit* subterete, the marginal sides broader than the valves, deeply sulcate, often giving a twisted, rope-like appearance to the legume.

This group includes mostly the species of the § INGA of Bentham and constitutes the part of the genus where the variability has reached its highest complexity. The definition of the species becomes very difficult owing to the overlapping of the characters.

It includes in the first place a group of species centering around *I. vera, I. edulis* and *I. oerstediana.* This group is more developed in Mexico and Colombia than elsewhere. In the former country some morphological variants have been described as species, which in the present treatment are reduced mostly under *I. vera.*

A second group is formed by three species without any clear relationship with the first. They are *I. pauciflora, I. brenesii and I. coclensis.* The scanty material available for this latter group does not permit any clear idea of its variability.

SPECIES . . . 40-47

a. Rhachis winged (terete in some specimens of *I. oerstediana*).
  b. Branchlets, leaves and inflorescences densely ferrugineous-hirsute.
    c. Corolla 12-16 mm long; flowers not congested. Panama .....40. I. PAUCIFLORA
    cc. Corolla 20-23 mm long; flowers on short rhachises. Costa Rica 41. I. BRENESII

bb. Branchlets, leaves and inflorescences cinereous-tomentose to glabrescent (often ferrugineous-tomentose in *I. oerstediana*).
d. Inflorescences spiciform; flowers sessile to very shortly pedicellate.
e. Calyx 3-6 mm long; legume 8-24 cm long; leaflets oblong to obovate, in 3-4 pairs. Mexico to Panama .....42. I. OERSTEDIANA
ee. Calyx 8-19 mm long.
f. Legume 40-120 cm long; leaflets oblong to lanceolate, in 4-6 pairs; bracts lanceolate, 4-6 mm long. Honduras. Costa Rica to Panama .....43. I. EDULIS
ff. Legume 10-32 cm long.
g. Bracts ovate-oblong, 9-14 mm long; leaflets obovate to lanceolate, generally in 3-4 pairs. Mexico. .....44. I. LATIBRACTEATA
gg. Bracts lanceolate, 3-9 mm long; leaflets elliptic to lanceolate, generally in 4-7 pairs. Greater Antilles; Mexico to Panama .....45. I. VERA
dd. Inflorescences corymbiform; flowers always with well developed pedicels. Guadeloupe to Trinidad .....46. I. INGOIDES
aa. Rhachis terete. Panama .....47. I. COCLENSIS

40. INGA PAUCIFLORA Walp. & Duchass., Linnaea **23:** 746, 1850. (Type *Duchassaing s.n.*)

Small *trees;* branchlets terete, striate, densely ferrugineous-pubescent, in age glabrate, the internodes short. *Leaves* with 3-4 pairs of leaflets; leaflets lanceolate to ovate, acute or acuminate, the base acute to obtuse, asymmetric, above appressed-yellow-pilose when young, in age glabrate and lustrous, the nerves deeply impressed, beneath densely yellow-pilose, the nerves prominent, the upper pair lanceolate-elliptic to broadly elliptic, 9-13 cm long, 4-7 cm wide, the basal pair markedly ovate, 2-5 cm long, 1-2 cm wide, the petiolules less than 1 mm long, conic densely ferrugineous-pubescent; rhachis winged, 3-9 cm long, ferrugineous-pubescent, the glands shortly stipitate, glabrous, retuse; petiole terete, 0.5-1.5 cm long, pubescent; stipules ovate, 4 mm long, ferrugineous-pubescent to glabrous, deciduous. *Inflorescences* solitary or geminate, axillary or terminal; peduncle slender, 1.5-2.5 cm long, densely ferrugineous-pubescent; rhachis hairy, 1-3 cm long, the bracts, obovate, up to 2 mm long, subpersistent. *Flowers* sessile; calyx tubular-funnelform, 8-11 mm long, striate, densely yellow-pubescent, the teeth acute, about 2 mm long, corolla tubular, 12-16 mm long, slightly spreading, appressed-pilose; staminal tube included. *Legume* (immature) terete, curved, up to 14 cm long, 1 cm wide, densely ferrugineous-pilose, ending in a sharp point.

Lowlands of central Panama, apparently common in forests and clearings.

PANAMA: CANAL ZONE: Ancon Hill, *R. S. Williams* 32 (NY, US); Barro Colorado Island, *Bangham* 462 (F), *Shattuck* 1067 (F), *Starry* 153 (F), *Woodson & Schery* 969 (MO, US), *Zetek* 3740 (F), 3907 (F, MO); Chiva-Chiva trail, *Piper* 5725 (US). PANAMA: Chorrera to Capira, *Zetek* 3927 (F, MO); Panama, *Duchassaing s. n.* (GH). VERAGUAS: Santa Fé, *Allen* 4417 (MO).

Bentham (Trans. Linn. Soc. **30:** 627, 1875) reduced *I. pauciflora* to synonymy with *I. vera,* basing this assumption on the Duchassaing collection alone. Pittier (Contr. U.S. Nat. Herb. **18:** 214, 1916) reinstated its specific value, and put it

among his EUINGA-SULCATAE. In this series it does not have any close allies, but the fruit and flower characters do not leave any doubt about its place in the series INGA (i.e. SULCATAE Pittier).

41. INGA BRENESII Standley, Publ. Field Mus. Nat. Hist., Bot. Ser., **18:** 495, 1937. (Type *Brenes 5121*)

*Trees* 5 to 8 m tall; branchlets angulate, densely ferrugineous-tomentose, lenticellate. *Leaves* with 3 pairs of leaflets; leaflets obovate to elliptic, coriaceous, the margins revolute, the apex acute to mucronate, cuneate at the base, above lustrous, glabrous, but sparsely pilose along the impressed nerves and on the margin, beneath dull, dark, pilose, the nerves very prominent, the upper pair obovate 9-13 cm long, 4-8 cm wide, median and lower pairs elliptical, sometimes asymmetric, the basal pair 5-7 cm long, 2-3 cm wide, the glands small, shortly stipitate, glabrous; petiole angulate, sometimes winged, 1.5-2.5 cm long, densely ferrugineous-pubescent; stipules ovate, short, 3-4 mm long, persistent. *Inflorescences* axillary; peduncle terete, 2-4 cm long, striate, densely ferrugineous-pilose; rhachis 1.0-1.5 cm long, the bracts rhombic, acute, about 4 mm long, pubescent. *Flowers* sessile, congested, giving an umbellate appearance to the inflorescences; calyx tubular, 9-12 mm long, densely ferrugineous-pubescent, the teeth short and obtuse; corolla tubular-funnelform, 20-23 mm long, densely pilose, the lobes 3-6 mm long; staminal tube included; ovary thick, glabrous. *Legume* unknown.

Wet forests of the central highlands of Costa Rica.

Vernacular name: *guabo peludo* (Costa Rica–Brenes).

COSTA RICA: ALAJUELA: La Palma, San Ramón *Brenes 5121* (CR, F), *4988* (CR, F, IAIAS).

*Inga brenesii* is placed in the series INGA on the basis of its similarity to *I. pauciflora* in foliar and floral characters, since its fruit is unknown. The thick ovary also suggests that the legume may be subterete, and according to the other characters it is difficult to place in any other series.

42. INGA OERSTEDIANA Benth. ex Seem., Bot. Voy. Herald 117, 1853. (Type *Oersted 12*)

*Feuilleea oerstediana* (Benth.) O. Ktze., Rev. Gen. Pl. **1:** 188, 1891.
*Inga eriorhachis* Harms in Fedde, Rep. Sp. Nov. **13:** 525, 1915. (Type *Tonduz 1214*)
*I. cobanensis* Pittier, Contr. U. S. Nat. Herb. **18:** 188, 1916. (Type *Tuerckheim 11630*)
*I. tuerckheimii* Pittier, loc. cit. 192. (Type *Tuerckheim 1214*)
*I. edulis* Mart. var *grenadensis* Urb. in Fedde, Rep. Sp. Nov. **15:** 307, 1918 (ex char.; Type *Eggers 6384, not seen*)
*I. culagana* Britton & Killip, Ann. N. Y. Acad. Sci. **35:** 115, 1936. (Type *Killip & Smith 20165*)
*I. pamplonae* Britton & Killip, loc. cit. 119. (Type *Killip & Smith 19777*)
*I. chartana* Britton & Killip, loc. cit. (Type *Killip & Smith 19088*)
*I. chiriquensis* Standley, Publ. Field Mus. Nat. Hist., Bot. Ser., **22:** 78, 1940. (Type *Davidson 928*)
*I. edulis* Mart. var. *minutiflora* Schery, Ann. Missouri Bot. Gard. **37:** 109, 1950. (Type *Allen 968*)

*Trees* 6 to 18 m tall; branchlets terete or angulate, densely ferrugineous- or cinereous-tomentose. *Leaves* with 3-4 (rarely 5) pairs of leaflets; leaflets subchartaceous, oblong to obovate, the apex obtuse to shortly acuminate, the base rounded or cuneate, often oblique, above dull, sparsely pilose, the nerves slightly prominent and tomentose, beneath densely ferrugineous- or cinereous-tomentose, the lateral nerves straight, anastomosing close to the margin and with the tertiary nervation transverse and conspicuous, the upper pair elliptic to obovate, 8-22 cm long, 4-12 cm wide, the intermediate pair slightly smaller, often oblique, the basal pair ovate to lanceolate, 4-13 cm long, 3-8 cm wide (the dimension and shape of the leaflets are quite variable in the same branchlet), the petiolules conic, 1-2 mm long, densely tomentose; rhachis terete, subalate, or markedly winged, 7-22 cm long, densely tomentose on the midrib, the wings elliptic, each up to 1.5 cm wide (saccate at the base in some Guatemalan specimens), the glands large, patelliform to crateriform, circular or triangular, at the border with the rim fleshy and narrower at the sides; petiole terete or winged, 2-7 cm long, densely tomentose; stipules ovate, 2-3 mm long, pubescent, caducous. *Inflorescences* 1-4, axillary, fasciculate or paniculate on short axes; peduncle terete, stout, 1-4 cm long, densely ferrugineous- or cinerous-tomentose; rhachis 1-4 cm long, the bracts reniform to ovate, 1-4 mm long, caducous. *Flowers* sessile, not congested; calyx cupulate-tubular, 3-6 mm long, densely tomentose, the teeth 1-2 mm long, often irregular; corolla tubular, spreading above, 9-15 mm long, appressed-pilose, the lobes acute, 2-3 mm long; staminal tube included to exserted, the filaments about 1.0-2.5 cm long; ovary oblong, glabrous. *Legume* terete, oblong, 8-24 cm long, 1.0-2.5 cm in diam, densely ferrugineous- or cinereous-tomentose, at maturity the margins rather straight.

Mexico to Panama; West Indies, from sea level to 1800 m elevation. (South America.)

Vernacular names: *jaquinicuil* (Mexico-Hinton); *cushin* (Guatemala-Standley); *guama pachona* (Honduras - von Hagen); *cuajiniquil peludo* (Costa Rica).

MEXICO: GUERRERO: Minas, Pilas, *Hinton 10746* (F, GH, K, MO, NY, US). OAXACA: Cafetal Concordia, *Ll. Williams 9380* (F, MO); Ubero, *Morton & Makrinius 2496* (F, US).

BRITISH HONDURAS: Middlessex, *Schipp* 383, (F, GH, MO, NY, US); Stann Creek, *Gentle 3020* (K, NY).

GUATEMALA: ALTA VERAPAZ: Carchá, Chicoj, *Standley 70045* (F); Cobán, *Standley 69543* (F); Cobán to San Pedro Carchá *Standley 90017* (F); Samac, NW of Cobán, *Standley 89677* (F), *89708* (F, US); San José, SE of Tactic, *Standley 69621* (F); Sepacuité, *O. F. Cook 124* (US), *Cook & Griggs 50* (US), *227* (US), *228* (US), *620* (US); Tactic, *Popenoe 781* (US), *Standley 92509* (F); Tactic to Tamahu, *Standley 71260* (F), *91364* (F). CHIMALTENANGO: Chimaltenango to San Martín, Jilotepeque, *Standley 64478* (F). ESCUINTLA: Barranco Hondo, above Las Lajas, *Standley* 63873 (F). QUEZALTENANGO: Colomba, road to Asintal, *Standley 87910* (F); San Lorenzo, El Cubo, *L. O. Williams 13208* (F); Volc. Sta. María, Sta. María de Jesús to Calahuaché, *Steyermark 33716* (F). SACATEPEQUEZ: Cerro de La Cruz, Antigua, *Standley 63336* (F); Dueñas, *Standley 63131* (F, NY). SUCHITEPEQUEZ: Mocá, *Bequaert 56* (F, GH). PROVINCE UNKNOWN: San Miguelito, Santa Rosa, *Bernouilli & Cario 1252* (K); Esperanza, *Maxon & Hay* 3355 (US).

SALVADOR: AHUACHAPAN: Ataco, *Standley & Padilla* 2733 (F). LA LIBERTAD: Finca Germania, near Comasagua, *Carlson 206* (F); Santa Tecla, *Levy* 786 (EAP). SAN SALVADOR: Volc. San Salvador, *Calderón 1564* (GH, US). SANTA ANA: Finca Pilón, Los Naranjos, *Williams, Molina & Levy 15168* (F, EAP).

HONDURAS: ATLANTIDA: Lancetilla, *Yuncker 4922* (F, MO); Tela, *Standley 53601* (F, GH, MO, NY, US), *56548* (F), *56617* (F). COLON: Tanjica, near Trujillo, *Bangham 250* (F). EL PARAISO: Güinope, *Standley & Williams 4556* (F). *Williams & Molina 11993* (F, GH). MORAZAN: La Montañita, *Williams & Molina 21669* (F, GH); La Montañita, above Suyapa, *Williams 15745* (EAP, F, US). YORO: Pijol, Subirana, *von Hagen 1117* (F, NY); Subirana, *von Hagen & von Hagen 1071* (F, NY).

NICARAGUA: MANAGUA: Casa Colorada, *Maxon, Harvey & Valentine 7384* (US); Crucero, *Standley 8221* (F); Managua, *Garnier 1062* (US). ZELAYA: El Recreo, *Standley 19126* (F), *Lewis 38* (F).

COSTA RICA: ALAJUELA: La Tigra, San Carlos, *Barquero 12* (IAIAS, MO); San Pedro, San Ramón *Brenes 5495* (CR, F, IAIAS); Zarcero, *A. Smith 121* (F, MO). CARTAGO: Aguacaliente, *Pittier 2372* (CR, US), *Torres 82* (F); Cartago, *Cook & Doyle 19* (US) *20* (US); Dulce Nombre, *Standley 35820* (US); Las Cóncavas, *Pittier 16661* (GH, US); Las Vueltas de Tucurrique, *Tonduz 12745* (CR, NY, US); Tres Ríos, *León 1235* (CR); Turrialba, *Holdridge 2549* (IAIAS), *León 1533* (IAIAS). HEREDIA: Barba, *León 3926* (IAIAS); Heredia, *León 1498* (IAIAS); Río Ciruelas, *Tonduz 2236* (CR, US); San Francisco, *León 3807* (IAIAS); Santo Domingo, *Echeverría 316* (F). LIMON: Guácimo, *United Fruit Co. 144* (US); Suerre, *J. D. Smith 6491* (US). SAN JOSE: Belmira de Dota, *Tonduz 11636* (CR, GH, MO, US); Candelaria, *Oersted 12* (K), *4420* (F, K); Copey, *Tonduz 11683* (CR, GH, K, NY, US); San Pedro de Coronado, *M. Valerio 1737* (F); Santa María de Dota, *Standley & Valerio, 44123* (NY, US); Vueltas de Jorco, *León 3828* (IAIAS), *3831* (IAIAS).

PANAMA: BOCAS DEL TORO: Changuinola Valley, *Dunlap 582* (F); Cricamola, *G. P. Cooper 527a* (F). CANAL ZONE: Barro Colorado Island, *Bangham 395a* (F), *Bailey & Bailey 345* (F), *670* (F), *M. Brown 129* (F), *Chickering 56* (F), *Kenoyer 371* (US), *Shattuck 426* (F), *Standley 31236* (US), *Starry 216, Wetmore & Abbe 72* (F, GH), *Woodworth & Vestal 361* (F), *Zetek 3578* (F), *3619* (F); Gamboa, *Allen 1972* (GH, MO, NY, US); Gorgona, *Pittier 2696* (F, GH, NY). CHIRIQUI: Boquete, *Davidson 536* (F, MO) *928* (F, MO), *Pittier 3130* (NY, US); Cerro Punta, *Allen 1573* (GH, NY, US). DARIEN: El Real, *Allen 968* (GH, MO, US).

GRENADA: Ammandale, *Broadway s. n.* (F, NY); Balthazar, *J. S. Beard 197* (MO); without locality, *Eggers 6236* (US).

TOBAGO: The Widow, Three Flowers, *Broadway 4659* (MO, NY, US).

The specific delimitation of *I. oerstediana* here offered includes some entities attributed up to now to *I. edulis,* which were separated from the former on the color of the indument alone. It seems now that they are forms occurring at different elevations and that plants from the cloud forest possess in general a thicker and ferrugineous indument while in those growing at lower elevations the hairs are cinereous and more sparsely distributed.

The species itself is quite variable and some of the entities among those reduced to synonymy are local variants: 1) Some populations of Guatemala, Salvador and Honduras that fall under *I. cobanensis* (commonly classified as *I. micheliana*) have somewhat smaller calyces and leaves than the typical plants, but intergrade well within the specific variability. 2) Plants from the highlands of Mexico, Guatemala, Costa Rica and Panama are very similar, corresponding to the typical population. *Inga eriorhachis,* in which the rhachis is completely terete, is a form occurring in Costa Rica, but it seems that rhachial parts are particularly variable in *I. oerstediana.* 3) Included in this species are two varieties, one from Grenada and Tobago (*I. edulis* var. *grenadensis* Urb.) and another from Panama (*I. edulis* var. *minutiflora* Schery). These seem to have no apparent relation to the typical populations of *I. edulis* that occur in South and Central America, but are close to the *I. oerstediana* complex, especially to those variants occurring in the lowlands.

In South America *I. oerstediana* is known definitely from Venezuela to Ecuador

but probably *I. endlicheri* (O. Ktze.) Macbride, described by Poeppig as *I. fasciculata,* and some specimens from northern Bolivia may belong to the same species.

As noted above, the separation of *I. oerstediana* and *I. edulis* in herbaria is rather confused. The study of many specimens and mass collections seems to clarify the two concepts as far as *I. edulis* var. *typica* is concerned. The striking differences are in calyx size, shape and number of leaflets, size of bracts and probably the length of the legumes, and do not offer any important overlapping between the typical populations of *I. edulis* and *I. oerstediana.*

*Inga oerstediana* is often planted in Central America as a shade tree in the coffee and cacao groves. The fruits, although edible, are of rather poor quality. Standley and Steyermark report the use of the leaves in Guatemala, to wrap "tamales" to which they impart a purplish tinge much admired by the local people.

43. INGA EDULIS Mart., Flora **20:** Beibl. 113, 1837. (Based on *Mimosa ynga* Vell.).

*Mimosa ynga* Vell., Fl. Flum. Ic. 11, *t.* 3, 1827. (ex ic.)
*Inga vera* H.B.K., Nov. Gen. Sp. Pl. **6:** 289, 1827, non Willd. (*fide* Bentham).
*I. ynga* (Vell.) J. W. Moore, Bernice P. Bishop Mus. Occ. Pap. 10, **19:** 6, 1934.

*Trees* 6 to 15 m tall; branchlets terete or angulate, densely tomentose. *Leaves* with 4-6 (generally 5) pairs of leaflets; leaflets subchartaceous, oblong to lanceolate, the apex acute, narrowly acuminate to mucronate, the base rounded, above minutely and sparsely pubescent to scabrous, the nerves slightly prominent and more pilose, beneath paler, sparsely pilose, the nerves prominent, the upper pair narrowly elliptic to rhombic, 8-18 cm long, 3-8 cm wide, the basal pair lanceolate, 3-7 cm long, 2-4 cm wide, the petiolule conic, 1-2 mm long, densely pilose; rhachis winged, 6-14 cm long, the wings cuneate, the glands patelliform to crateriform, the rim fleshy, thinner at the sides; petiole terete, 2-6 cm long, densely tomentose, the pulvinar section thicker; stipules broadly ovate, about 3 mm long, pilose, caducous. *Inflorescences* 1-6, axillary, paniculate; peduncle terete or angulate, rather slender, 2-6 cm long, striate, tomentose; rhachis 3-4 cm long, the bracts lanceolate, 4-6 mm long, caducous. *Flowers* sessile, distant on the lower part of the rhachis, congested above; calyx tubular, 7-9 mm long, cinereous-tomentose, the teeth obtuse, 1-2 mm long; corolla tubular, 14-20 mm long, appressed-pilose, the lobes acute, 2-5 mm long, spreading; staminal tube included to exserted, the filaments 2-3 cm long; ovary oblong, glabrous, the style about 3.5 cm long. *Legume* markedly sulcate, up to 120 cm long.

Honduras (cultivated?) to Panama. (South America.)

Vernacular name: *guabo mecate* (Costa Rica and Panama).

HONDURAS: MORAZAN: El Zamorano, *Standley 13079* (F), *16086* (EAP, F).

COSTA RICA: ALAJUELA: La Paz, San Ramón, *Córdoba 187* (IAIAS), *189* (IAIAS). CARTAGO: Instituto de Ciencias Agrícolas, Turrialba, *Córdoba 92* (IAIAS); La Dominica, Turrialba, *León 3952* (IAIAS). HEREDIA: La Bermúdez, *León 3832* (IAIAS); San Francisco, *León 3817* (IAIAS), *3818* (IAIAS). LIMON: Shirores, *Tonduz 9357* (CR, US). PUNTARENAS: Boruca, *Tonduz 4710* (CR); Térraba, *León 1136* (CR), *Tonduz 3825* (CR).

PANAMA: BOCAS DEL TORO: Almirante, *Cooper & Slater 38* (US); Changuinola Valley, *Dunlap 220* (F, MO); Chiriqui Lagoon, *von Wedel 1000* (GH, MO); Water Valley, *von Wedel 1096* (GH, MO).

*Inga edulis* is a South American species well known in Brazil as a fruit tree. It is doubtful whether this species is native in Central America, for apparently all collections come from trees close to old or new settlements. This *Inga* produces large fruit up to a meter long; nowhere in Central America, however, do they reach the size and quality as in South America. It is also commonly planted as shade trees in coffee and cacao fields, since it has a well spreading crown and produces large quantities of leaves which cover the ground and add considerable quantities of organic matter to the soil.

*Inga edulis* is exceedingly variable. In the same field where they are cultivated for shade, it is possible to detect individuals with small or large leaflets, with long or relatively short fruits, with dense or open foliage. It is also quite possible that hybridization among these individuals as well as with other species, like *I. oerstediana,* may be the factor that determines its high variability.

44. INGA LATIBRACTEATA Harms in Fedde, Rep. Sp. Nov. **19:** 64, 1923. (Type *Pringle 8159*)

*I. sciadodendron* Harms in Fedde, loc. cit. 62. (Type *J. A. Purpus 279* photo)
*I. zapacuanica* Harms in Fedde, loc. cit. 63. (Type *C. A. Purpus 3684*)
*I. endlichii* Harms in Fedde, loc. cit. (ex char.; Type *Endlich 1536,* not seen)

*Trees;* branchlets terete, when young densely ferrugineous-tomentose, in age glabrescent and lenticellate. *Leaves* with 3-5 (generally 4) pairs of leaflets; leaflets elliptic to lanceolate, the apex acute to obtuse, generally shortly mucronate, the base obtuse to rounded or somewhat cordate, above scabrous-pilose, opaque, the nerves and costa slightly prominent and more pubescent, beneath ferrugineous-tomentose, the lateral nerves markedly prominent, the upper pair cuneate-elliptic to obovate, 12-17 cm long, 5-9 cm wide, the lower pair lanceolate to elliptic, 5-7 cm long, 3-4 cm wide, the petiolules conic, 2-3 mm long, ferrugineous-tomentose; rhachis winged, 6-12 cm long, the wings elliptic and pubescent, the glands patelliform, sessile, 1-2 mm in diam; petiole often terete, rarely winged, 2-5 cm long, densely ferrugineous-tomentose. *Inflorescences* 1-3 per axil, rarely terminal; peduncle terete, tomentose, 3-5 cm long; rhachis 2-4 cm long, the bracts lanceolate to ovate, 7-12 mm long, pubescent, caducous. *Flowers* rather loose, sessile; calyx tubular, 7-12 mm long, tomentose, the teeth acute, 2-4 mm long; corolla tubular, spreading above, 12-20 mm long, appressed-pilose, the lobes acute, 3-4 mm long; staminal tube included to exserted. *Legume* (immature) subterete, 10-22 cm long, sulcate, densely ferrugineous-tomentose.

Highlands of Veracruz.

MEXICO: VERACRUZ: Jalapa, *Pringle 8159* (F, GH, MO), *C. L. Smith 1690* (EAP, NY), *Schiede s. n.* (GH); Mirador, *J. A. Purpus 279* (photo NY); Misantla, *Schiede s. n.* (GH); Orizaba, *Botteri 365* (GH); Zacualpán, *C. A. Purpus 3684* (F, MO), *8765* (GH, MO, NY), *10698* (F, NY), *10700* (NY), *10964* (F), *14036* (F, NY).

*Inga latibracteata* is a highly variable species confined in geographic distribution to the highlands of Veracruz. The populations are so variable that the few specimens available are different from one another but intergrade in important

characters among themselves, and for this reason have been reduced into one species.

The limits of *I. latibracteata* are not clear. On one hand it merges into the vast complex of *I. vera* subsp. *spuria*, as in the case of the type of *I. zapacuanica*, while on the other hand it is closely related to the Central American *I. oerstediana* in the size and shape of the leaflets, flowers and pods, as well as in the ferrugineous tomentum found upon all parts of the plants. The striking variability may suggest a hybrid origin or that we are dealing here with immature species in process of evolution. It would be highly desirable to obtain population samples in order to ascertain the nature of this interesting problem.

45. INGA VERA Willd. in L., Sp. Pl. **4:** 1010, 1806. (Based on *Mimosa inga* L.)

*Mimosa inga* L., Sp. Pl. 1498, 1753, non Vell. (Based on Sloane, Hist. **2:** 58, *pl. 183, fig. 1, 1629*)

*Trees;* branchlets terete, pubescent to glabrate, lenticellate. *Leaves* obovate to lanceolate, the apex rounded to acuminate, rarely mucronate, the base acute to rounded, above sparsely pilose, opaque, the nerves slightly prominent, beneath more densely pilose or tomentose, the nerves prominent, the upper pair obovate to narrowly elliptic, 3-22 cm long, 2-9 cm wide, the basal pair lanceolate, 2-12 cm long, 1-6 cm wide, the petiolules short, conic, 1-4 mm long, densely pilose; rhachis winged, 4-14 cm long, pubescent on the midrib, the wings elliptic or cuneate, the glands patelliform, circular or triangular in outline, less than 2 mm wide; petiole terete or winged, 2-4 cm long, pilose to glabrescent; stipules ovate to lanceolate, 3-7 mm long, caducous. *Inflorescences* axillary or terminal, 1 to many, fasciculate or paniculate; peduncle terete, 4-8 cm long, pubescent; rhachis 2-6 cm long, the lower flowers distant, congested above, the bracts reniform to lanceolate, 3-11 mm long, caducous or subpersistent. *Flowers* sessile to shortly pedicellate, few to many, distant or congested; calyx cylindric to turbinate, 9-18 mm long, 5-7 mm wide, pilose to tomentose, the pubescence ferrugineous to cinereous; corolla tubular, spreading above, 9-22 mm long, appressed-pilose; staminal tube included to exserted. *Legume* subterete, sulcate, straight or curved, 12-22 cm long, densely tomentose to glabrescent.

Mexico to Panama; Jamaica to Puerto Rico. (South America.)

*Inga vera*, the type species of the genus, is also the most complex within it. Its origin is probably South American. In the Greater Antilles minor variations are observed from one island to the other, but its main variants in this area also are found on the Continent. Within the whole range, from Mexico to Panama, it is possible to observe numerous variants, some of which have received specific rank. After long study the conclusion reached agrees with the old opinion of Bentham that despite the high variability, the different morphological types can be grouped under a rather small number of subspecific populations. Three of them are recognized here: one in the Greater Antilles, a second in western Mexico, and a third from eastern Mexico to Panama. (South America.)

The reduction under one species of the many types found, especially in

Middle America, has been done in the past by Harms, Taubert, J. D. Smith, etc., contrary to the view of Pittier who not only considered the Central American plants distinct from those of the Caribbean, but divided the former into several species. If these small units are accepted it will be necessary to multiply the number of species *ad infinitum*, and to recognize as such the many other variants that occur in the area.

KEY TO THE SUBSPECIES

a. Calyx cylindric, 10-14 mm long, 4-6 mm wide; leaflets of the upper pair broadly elliptic to obovate, sparsely pilose to almost glabrous. Jamaica, eastern Cuba, Hispaniola, and Puerto Rico .....45a. I. VERA subsp. VERA

aa. Calyx turbinate or subcylindric; leaflets of the upper pair narrowly elliptic or obovate to falciform, sparsely to densely pilose.

b. Calyx short and broad, the width at the mouth one half or more the length; floral peduncles less than 4 cm long, stout; bracts oval to reniform, less than 6 mm long; leaflets generally in 4 (2-5) pairs; pubescence of the branchlets, leaves and flowers, ferrugineous. Highlands of Mexico, from Sinaloa to Morelos and Chiapas .....45b. I. VERA subsp. ERIOCARPA

bb. Calyx elongate; floral peduncles slender and long, 5-7 cm long; bracts lanceolate, 6-9 mm long; leaflets generally in 6 (5-9) pairs; pubescence of the branchlets, leaves and flowers commonly cinereous (or ferrugineous in plants found at high altitudes). Mexico: Coahuila and Tamaulipas to Tabasco on the eastern side, lowlands of Guerrero to Chiapas in the western side; Guatemala to Panama .....45c. I. VERA subsp. SPURIA

45a. INGA VERA Willd. subsp. VERA.

*I. lamprophylla* C. Wright in Benth., Trans. Linn. Soc. **30:** 627, 1875, nom. nud. pro syn. (Type *Wright, Parry & Brummel 68*)
*Feuilleea inga* (L.) O. Ktze., Rev. Gen Pl. **1:** 184, 1891.
*Inga vera* Willd. subsp. *lamprophylla* (C. Wright) Pittier, Contr. U. S. Nat. Herb. **18:** 216, 1916.
*I. vera* Willd. subsp. *portoricensis* Pittier, loc. cit. 217. (Type *Heller 4471*)
*I. inga* (L.) Britton, Fl. Bermuda 170, 1918.
*I. vera* Willd. var. *lamprophylla* (C. Wright) Macbride, Contr. Gray Herb. n.s. **59:** 1, 1919.
*I. vera* Willd. var. *portoricensis* (Pittier) Macbride, loc. cit.

*Trees;* branchlets terete, striate, ferrugineous-tomentose to glabrate, lenticellate. *Leaves* with 3-6 (generally 4-5) pairs of leaflets; leaflets broadly elliptic to lanceolate, the apex acute to long-acuminate, the base cuneate to rounded, above sparsely pilose to glabrescent, the nerves slightly impressed and more pilose, beneath sparsely and shortly pubescent to almost glabrous, the nerves prominent, the upper pair broadly elliptic to rhombic, 8-13 cm long, 4-6 cm wide, the basal pair lanceolate, 4-5 cm long, 2-3 cm wide, the petiolules about 1 mm long, densely pilose; rhachis winged, 6-4 cm long, tomentose on the midrib, the wings cuneate, the glands patelliform, sessile to very shortly stipitate, about 1 mm in diam; petiole terete, or winged above, 1-2 cm long, pilose, the pulvinus darker and thicker; stipules lanceolate, acute, 4-6 mm long, caducous. *Inflorescences* axillary or terminal, 1-4; peduncle slender, 2-5 cm long, tomentose to glabrescent; rhachis 2-4 cm long, the bracts lanceolate, 3-4 mm long, caducous. *Flowers* sessile or very shortly pedicellate, distant in the lower part of the rhachis, congested in the upper part; calyx cupulate-tubular, 8-14 mm long, tomentose, the teeth acute,

3-4 mm long; corolla tubular, dilating above, 14-17 mm long, appressed-pilose, the lobes acute to obtuse, 3-4 mm long; staminal tube included to slightly exserted, the filaments about 4 cm long. *Legume* sulcate, 10-15 cm long, 1-2 cm wide.

Jamaica, eastern part of Cuba, Hispaniola, Puerto Rico.

Vernacular name: *guaba* (Puerto Rico–Britton).

JAMAICA: HANNOVER: mouth of Río Grande, *A. E. Wight 141* (F, NY). PORTLAND: Moore Park to Portland, *Harris 6613* (US); Port Antonio, *Fredholm 3204* (US), *Hitchcock s. n.* (MO). ST. ANN: New Ground, *Harris 10364* (F, NY, US); New Grounds River, *Britton 2494* (NY). ST. MARY: Castleton, *Fawcett 8013* (F, NY). ST. THOMAS: Bath, *Britton 3489* (NY); Port Morant, *Hitchcock s. n.* (MO); Spring, St. Thomas, *Harris 5406* (US); WITHOUT LOCALITY: *Alexander s. n.* (NY), *Griseb. Fl. W. Ind. 471* (GH), *Hart 1025* (US), *1026* (US).

CUBA: ORIENTE: Joturito, *Ekman 16046* (US); San Juan Hill, *Shafer 12420* (MO, NY, US); Santiago, *Havard 109* (NY).

HAITI: ARTIBONITE: Ennery, *Ekman 9669* (US); Gros Morne, *E. C. Leonard 9825* (GH, US); Marmelade, *E. C. Leonard 8351* (US), *8355* (US), *Nash 686* (NY); Petit Rivière, *Sweet 7* (US); St. Marc, *E. C. Leonard 2952* (GH, NY, US); St. Michel de l'Atalaye, *E. C. Leonard 7510* (NY, US), *Miller 293* (US). NORD: Bayeux, near Port Margot, *Nash 337* (F, NY). NORD-OUEST: Jean Rabel *Leonard & Leonard 13809* (GH, NY, US), *12677* (US); St. Louis du Nord, *Leonard & Leonard 14215* (US). OUEST: Port-au-Prince, *Jaeger 109* (GH, NY, US). WITHOUT LOCALITY: *Buch 317* (US).

DOMINICAN REPUBLIC: ALTA GRACIA: Higuey, *Taylor 392* (F, NY). AZUA: Azúa, *Rose, Fitchell & Russell 3987* (NY, US). BARAHONA: Barahona, *Fuertes 50* (NY, US); Paraíso, *Abbot 1648* (US); Pedernales to Aceital, *Howard & Howard 8239* (GH) SAN JUAN: El Cercado, *Howard & Howard 8667* (GH); Río Juan, *Miller 1254* (US). LA VEGA: Jarabacoa: *Allard 14841* (US). PUERTO PLATA: La Cumbre, *Raunkiaer 1251* (US). SAMANA: Samaná, *Wright, Parry & Brummell 68* (GH, US); Sánchez, *Abbott 78* (GH, US). SEIBO: Jovero, *Abbot 2544* (US). SANTO DOMINGO: Santa Domingo, *Schiffino 166* (GH); Haina, *Farris 531* (US). WITHOUT LOCALITY: *Scarff s. n.* (F), *Prenleloup 146* (NY, US).

PUERTO RICO: AGUADILLA: Maricao, *without collector,* (NY). ARECIBO: Utuado, *Britton & Cowell 402,* (F, NY). GUAYAMA: Agua Buena to Caguas, *Sintenis 2545* (US); Aibonito, *Heller 867* (F, NY, US); Caguas, *Underwood & Griggs 355* (US); Cayey, *Kuntze 403* (NY). HUMACAO: Río Icaco, S of Naguabó, *Shafer 3178* (NY, US), *3183* (NY); Sierra de Luquillo, *Sintenis 1533* (US). MAYAGUEZ: Las Mesas, *Holm 259* (F, GH, MO, NY); Mayagüez, *Heller 4471* (F, GH, MO, NY), *Otero & Gregory 1018* (US), *Sintenis 47* (GH); San Germán, *Miller 1663* (US); Yauco, *Sargent 520* (US). SAN JUAN: Bayamón, *Stahl 215* (US); Río Piedras, *Otero 227* (MO). PROVINCE UNKNOWN: Monte Llano, *Goll, Cook & Collins 465* (US); Quebrada Averías, *Goll, Cook & Collins 330* (NY); El Duque, *Stevenson 510* (US).

The variability of *I. vera* subsp. *vera* is rather reduced, although the plants present slight variations from island to island. This range, however, does not justify the creation of different entities. The most striking trends seem to be towards tubular calyces and broad leaflets, scarcely pubescent to almost glabrous in some Jamaican specimens. The plants in general are very similar to some collections from Mexico and Honduras; this fact, and their absence in the Lesser Antilles, seem to suggest that the Antillean plants came from the continent via Central America, and have developed their characteristics through a long isolation.

Linnaeus based his *Mimosa inga* partially on material from this area, described by Sloane, of which only a fruit is preserved. The illustration in the Hist. of Jamaica, *pl. 183, fig. 1,* 1629, is rather inaccurate, since it shows a terminal leaflet, but the fruit is in general well represented.

45b. INGA VERA Willd. subsp. **ERIOCARPA** (Benth.) J. León, stat. nov.

*I. eriocarpa* Benth. in Hook., Lond. Jour. Bot. **4**: 615, 1845. (ex char.; Type *Coulter s.n.*, not seen)
*I. oophylla* Riley, Kew Bull. **1923**: 401, 1924. (Type *González Ortega 250*)

*Trees;* branchlets terete or angulate with short internodes, densely ferrugineous-tomentose when young, glabrate and lenticellate in age. *Leaves* with 2-5 (generally 4) pairs of leaflets; leaflets subcoriaceous, obovate to broadly lanceolate, the apex acute to rounded, often curved, the base cuneate to rounded, above dull, gray to green when dry, covered with sparse, short and yellow hairs, the nerves slightly prominent and more pilose, beneath paler, densely to sparsely ferrugineous-tomentose, rarely glabrous, the nerves prominent, the upper pair obovate to elliptic, generally 6-11 cm long, 2-5 cm wide, the basal pair lanceolate, about half the size of the upper pair; rhachis winged, 4-9 cm long, densely tomentose on the midrib, the glands sessile, patelliform, less than 2 mm in diam; petiole terete or winged, 1.5-4.0 cm long, the pulvinus conic and thicker. *Inflorescences* axillary or terminal; peduncle stout, less than 4 cm long, densely ferrugineous-tomentose; rhachis about 3 cm long, the lower flowers rather distant, the upper congested, the bracts ovate to reniform, up to 6 mm long, densely ferrugineous-tomentose, caducous. *Flowers* sessile to markedly pedicellate; calyx turbinate, broad, the width always more than half the length, 8-12 mm long, 6-8 mm wide at the base of the teeth, densely ferrugineous-tomentose; corolla tubular, well exserted, 14-22 mm long, appressed-pilose, the lobes obtuse, 5-6 mm long; staminal tube included, the filaments about 3 cm long. *Legume* sulcate, straight or curved, 12-22 cm long, 1-2 cm in diam, densely ferrugineous-tomentose.

Southern and western slopes of the central highlands of Mexico, from Durango and Sinaloa to Morelos and Chiapas.

MEXICO: CHIAPAS: San Vicente, *Goldman 858* (US). DURANGO: Sierra Tres Picos, *Gentry 5317* (MO). GUERRERO: Acapulco, *Palmer 250* (F, GH, MO, NY, US); Achotla, *Reko 4911* (US); Coyuca, *Hinton 5527* (MO, NY, US); Jaripo, *Hinton 6483* (MO, US); Manchón, Mina, *Hinton 9248* (F, GH, MO, NY, US), *9259* (F, GH, MO, NY, US), *10074* (F, GH, MO, NY); Placeres, Mina, *Hinton 9089* (F, GH, MO, NY, US), *9997* (F, GH, MO, NY, US); San Luís de La Loma, *Langlassé 932* (GH, US); Taxco, *Abbot 100* (GH), *100a* (GH), *Lyonnet 668* (MO, NY, US); Tecpán, El Reparo, Galeana, *Hinton 14125* (US). JALISCO: Guadalajara, *Safford 1414* (US); La Palma, *M. E. Jones 183* (MO, US); San Sebastián, *Mexia 1842* (F, GH, MO, NY, US); Talpa to Mascota, *Nelson 4042* (GH, US), MEXICO: Acatitlán, Temascaltepec, *Hinton 3159* (MO, US), *5572* (F), *6184* (MO, NY, US); Ixtapán, Temascaltepec, *Hinton 6205* (F); Tejupilco, Temascaltepec, *Hinton 3981* (MO, NY), *6232* (F, US), *7349* (MO, US); Temascaltepec, *Hinton 5911* (F), *8977* (MO, NY, US). MICHOACAN: Apatzingán, El Capire, *Leavenworth 445* (F, GH); Coalcomán, *Hinton 12942* (GH, NY, US); Hacienda Coahuayula, *Emrick 22* (F); Los Reyes, *Nelson 6844* (GH, US); Sta. Inés, *Langlassé 34* (GH, US); Torrecillas, Coalcomán, *Hinton 13718* (NY, US). MORELOS: Cuernavaca, *Bilimek 936* (GH, NY, US), *Froderstrom & Hultén 456* (NY), *Leavenworth 930* (F), *Reko 4649* (US), *Rose & Hough 4361* (US); San Antón, Cuernavaca, *Seler 4183* (GH). NAYARIT: Acaponeta, *Lamb 536* (NY, US), *Rose 1437* (GH, NY, US), *Rose, Standley & Russell 14181* (NY); Cortina, *Gonzalez Ortega 14* (US); Esperanza, Mina, *González Ortega 6660* (US); Ixlán, *Viereck 1165* (US); La Labor, *Collins & Kempton 78* (US); Pedro Paulo, *Rose 3328* (US); Río Grande, E of Santiago, *Gregg 1060* (MO); Río San Pedro, vers. W de la Sierra, *Diquet s. n.* (NY); San Leonel, *Gregg 978* (MO); Tepic, *Gregg 987* (MO); Tuxpán, *Viereck 1201* (US). SINALOA: Concordia, La Calera, *Trejo 1109* (US); El Habal, *González Ortega 5195* (US); Sierra Madre, Colomos, *Rose 1701* (GH, K,

NY, US); San Ignacio, *González Ortega 250* (K); Villa Unión, *Rose, Standley & Russell 13968* (GH, NY, US). WITHOUT LOCALITY: *Halsted 26* (NY), *Kerber 428* (US); *Mociño & Sessé 3784* (F), *Müller 708* (NY).

The most typical plants of this subspecies occur in the states of Morelos, Mexico, Guerrero and Michoacan, at altitudes well above 1000 m. They are characterized by a dense, soft, ferrugineous pubescence, rather small leaves, generally with five pairs of leaflets, and broad calyces; the flowers are frequently pedicellate. The material available comes from restricted and widely separate areas in the dissected slopes of the plateaus south of the Central Valley of Mexico. Its variability may be the result of geographic isolation or perhaps the influence of other species, as suggested by some aberrant specimens from an isolated locality in Jalisco (*Mexia 1842*).

Towards the north, on the western slopes of the Sierra Madre Occidental, the plants of Nayarit, Jalisco and Sinaloa are less typical, and some of them approach subsp. *vera* in many characters. The leaflets are small, elliptic to lanceolate-ovate or even obovate in the upper pair, the calyces longer than in the typical plants, and the pubescence less dense and ferrugineous. Some of these more glabrous plants with ovate leaflets have been called *I. oophylla*. It is interesting to note that in this area the genus reaches its most northern point, in the Sierra de Tres Picos, Durango; on the eastern side of the country this species reaches almost the same latitude in Coahuila, while it is not found in the intermediate areas, the vast and dry bolsons of northern Mexico.

45c. INGA VERA Willd. subsp. **SPURIA** (Willd.) J. León, stat. nov.

*I. spuria* Willd. in L., Sp. Pl. **4:** 1011, 1806. (ex char.; Type *Humboldt & Bonpland s.n.* photo)
*Mimosa spuria* (Willd.) Poir. in Lam., Encycl. Suppl. **1:** 40, 1810.
*I. berteriana* DC., Mém. Leg. 438, 1825 (*fide* Bentham). (Type *Bertero s.n.* photo)
*I. mociniana* G. Don, Gen. Syst. Pl. **2:** 388, 1832 (*fide* Bentham). (Type *Mociño s.n.*, not seen)
*I. xalapensis* Benth. in Hook., Lond. Jour. Bot. **4:** 616, 1845. (Type *Linden 671* photo)
*Feuilleea spuria* (Willd.) O. Ktze., Rev. Gen. Pl. **1:** 189, 1891.
*F. xalapensis* (Benth.) O. Ktze., loc. cit.
*Inga donnell-smithii* Pittier, Contr. U. S. Nat. Herb. **18:** 211, 1916. (Type *J. D. Smith 2316*)
*I. fissicalyx* Pittier, loc. cit. 213. (Type *C. A. Purpus 1917*)

*Trees;* branchlets terete or angulate, cinereous to ferrugineous-tomentose, lenticellate. *Leaves* with 5-9 (generally 6-7) pairs of leaflets; leaflets subcoriaceous, elliptic to lanceolate, obtuse to acuminate at the apex, rounded to obtuse at the base, above grayish when dry, sparsely pilose to scabrous, the nerves slightly prominent, beneath tomentose to glabrate, the prominent nerves more pubescent, the upper pair elliptic to falciform, 9-17 cm long, 3-4 cm wide, the basal pair lanceolate or ovate, about half to two thirds the size of the upper pair, the petiolules conic, 1-2 mm long, pilose; rhachis winged, 8-13 cm long, tomentose on the midrib, the wings cuneate, the glands small, patelliform, 1-2 mm in diam; petiole terete or winged, 0.5-1.5 cm long, tomentose, the pulvinus very short to obsolete; stipules lanceolate,

4-7 mm long, caducous. *Inflorescences* terminal or axillary, 1 to many spikes, fasciculate or paniculate; peduncle terete, slender, 4-7 cm long, tomentose; rhachis up to 5 cm long, the bracts lanceolate, 6-9 mm long, caducous. *Flowers* sessile to markedly pedicellate, the pedicels obsolete to 8 mm long; calyx turbinate, 11-19 mm long, cinereous to ferrugineous-pubescent, the teeth acute, 5-6 mm long; corolla tubular, flaring above, 15-22 mm long, the lobes obtuse, 4-6 mm long; staminal tube generally included. *Legume* sulcate when young, in age subtetragonal, the valves narrower than the margins, 8-30 cm long, 1-2 cm wide, densely cinereous or ferrugineous-tomentose.

Mexico (Guerrero and Coahuila) to Panama. (South America.)

Vernacular names: *acotope* (Veracruz–Ll. Williams); *cuje, shalun* (Guatemala–Standley & Steyermark); *guabo* (Central America).

Mexico: chiapas: Chicomucelo, *Matuda 4477* (NY); Escuintla, *Matuda 22* (MO, NY, US); Escuintla, Esperanza, *Matuda 17640* (F); Monserrate, *C. A. Purpus 10311* (NY, US); Río Usumacinta, *Reko 4131* (US). coahuila: Gómez Farías, *Palmer 290* (F, GH, MO, NY, US). hidalgo: Huejutla, *Moore 2905* (GH), *Seler 894* (GH, US). oaxaca: Cuyamecalco, *Conzatti 3487* (US); Puerto Angel to Pochutla, *Nelson 2461* (GH, US); Rincon Antonio, *Orcutt 3228* (F, GH, MO, US); San Juan Lalana, *Schultes & Reko 792* (GH); Tuxitán, Tapana, *Seler 2044* (GH); Ubero, *Ll. Williams 9186* (F, MO, US); Yaveo, Choapam, *Mexia 9288* (F, GH, MO, NY). san luis potosi: Labra, Ciudad del Maíz, *Seler 765* (GH); Micos Falls, *Vines 3329* (US); Tamasopo, Cañon, *Pringle 5045* (GH); Valles, *Fisher 3361* (F, NY). tabasco: Achotal, Balancán, *Matuda 3038* (F, NY); San Juan Bautista, *Rovirosa 27* (US). tamaulipas: Tampico, *Palmer 568* (GH, MO, NY, US); Río Sabinas, *Meyer & Rogers 2850* (MO). veracruz: Cabrestos, *Liebmann 4429* (F); Colipa, *Liebmann 4442* (F, GH, US); Córdoba, *Bourgeau 2040* (GH, US); Dos Ríos, *Mell 556* (NY, US); Fortuño, *Ll. Williams 8515* (F), *8824* (F, MO, US), *8948* (F, MO, NY, US); Jalapa, *Schiede 673* (GH, NY); Lake Catemaco, *Nelson 425* (NY, US); Orizaba, *Bilimek 127* (GH), *Müller 2208* (NY); Pánuco, *Palmer 362* (F, GH, MO, NY, US); Río de los Pescados, *C. A. Purpus 10700a* (MO, NY, US), *11110* (MO, NY); San Francisco, near Veracruz, *C. L. Smith 1401* (EAP, NY); Santa Lucrecia, *C. L. Smith 991* (EAP, GH, MO, NY, US); Tantoyuca, *Ervenberg 10* (GH); Zacualpán, *Purpus 1917* (F, GH, MO), *8625* (GH, MO, NY, US).

British Honduras: El Cayo, *Bartlett 12992* (F, NY, US); Hope Creek, *Schipp 135* (F, GH, MO, NY, US); Little Cocquericot, *Lundell 4402* (US); Manatee Lagoon, *Peck 374* (GH, K); Maskall, *Gentle 1282* (F, GH, MO, NY); Middlessex, *Schipp 293* (GH), *295* (F, MO, NY, US); Mussell Creek, east of Boomtown, *O'Neill 8601* (F, GH, NY, US); Silk Grass Reserve, *Record 18* (NY, US); Vaca, El Cayo, *Gentle 2536* (F, MO).

Guatemala: alta verapaz: Gubilgüitz, *Tuerckheim 7854* (GH, MO, NY); Semococh, *Steyermark 45732* (F); Transvaal, *C. L. Wilson 304* (F); without locality, *Brigham s. n.* (GH), *Watson 213* (GH), *343* (GH). escuintla: Iztapa, *J. R. Johnston 1168* (F); Río Guacalate, NW of Escuintla, *Standley 89294* (F); Río Michatoya, SE of Escuintla, *Standley 89200* (F); Río Michatoya, *Standley 89202* (F); San Juan Mixtán, *J. D. Smith 2317* (GH, US); San Vicente Osuna, *Tonduz & Rojas 48* (US). guatemala: Amatitlán, *Kellermann 5058* (F), *6374* (F); Chinautla, *Holway 486* (US); Guarda Viejo, *J. D. Smith 2316* (GH, US). huehuetenango: Ciénega de Lagartero, Miramar, *Steyermark 51550* (F). izabal: Boca del Cahabón, *J. D. Smith 1673* (GH, NY, US); Golfete, *Rowlee & Rowlee 308* (NY, US); Los Amates de Quiriguá, *Steyermark 38327* (F); Quiriguá, *Standley 23842* (GH, MO, US), *24507* (GH, NY), *24557* (GH, MO, US), *72248* (F), *72314* (F), Río Izabal, *Blake 7843* (US). jalapa: Cerro Alcoba, Jalapa, *Steyermark 32607* (F); Jalapa, *Standley 76751* (F). jutiapa: Jutiapa, *Standley 75643* (F); Laguna dé Ayarza, *Heyde & Lux 3727* (GH, US); Trapiche Vargas to Asunción Mita, *Steyermark 31793* (F). quezaltenango: Río Ocosito, *J. D. Smith 2822* (US). peten: El Paso, *Lundell 1505* (F, GH, MO, NY, US); Tikal, *Bartlett 12650* (F). retalhuleu: Retalhuleu, *Bernouilli & Cario 1243* (K), *Standley 66712* (F), *88666* (F), *88724* (F), *88784* (F, MO); Río Ocosito, W of Retalhuleu, *Standley 88258* (F); Río Vil, W of Retalhuleu, *Standley 88300* (F), *88328* (F). sacatepequez: without locality, *Rojas 348* (US). santa rosa: Chiquimulilla, *Standley 79177* (F); Río de Los

Esclavos, *Heyde & Lux 3290* (GH, US). SOLOLA: Patahul, *Kellermann 5883* (US). SUCHITEPEQUEZ: Alotenango, *S* of Tiquisate, *Steyermark 47803* (F); Sto. Domingo, *S* of Mazatenango, *Standley 88898* (F). ZACAPA: Gualán, *Deam 380* (GH, MO, NY, US), *6303* (GH, US); Rio Teculután, *Steyermark 42136* (F). WITHOUT LOCALITY: *Lewton 401* (US).

SALVADOR: AHUACHAPAN: Ahuachapán, *Standley 20029* (GH, MO, NY, US). CABANAS: San Nicolás, *Calderón 1587* (US). LA LIBERTAD: La Libertad, *Standley 23236* (F, GH, MO, US). LA UNION: Laguna de Maquigüe, *Standley 20935* (GH, US); Zacatecoluca, *Calderón 319* (GH, MO, NY). SAN MIGUEL: San Miguel, *Standley 21142* (GH, MO, US). SAN SALVADOR: San Martín, *Calderón 1897* (GH, US); San Salvador, *Calderón 1565* (NY, US), *Standley 22466* (GH, US); San Salvador-La Palma, *Carlson 585* (F). SAN VICENTE: San Vicente, *Standley 21228* (GH, US), *21674* (GH, US), *Standley & Padilla 3660* (F). SANTA ANA: Metapán, *Standley & Padilla 3101* (F); San Miguel de Metapán, *Carlson 765* (F), *847* (F). SONSONATE: Acajutla, *Standley 21931* (GH, US); Izalco, *Pittier 1928* (US); Nahulingo, *Standley 22047* (GH, US); San Antonio del Monte, *Standley 22151* (GH, US). WITHOUT LOCALITY: *Calderón 68* (F).

HONDURAS: ATLANTIDA: Salado, *Yuncker, Koepper & Wagner 8333* (F, GH, MO, NY, US); Tela. *Blake 7273* (US), *Standley 54718* (F, US), *55146* (F, NY, US). COMAYAGUA: Comayagua, *Standley & Chacón 5750* (F), *5936* (F); El Banco, *Valerio 2508* (F); Las Limas, *Edwards 100* (F), *337* (F, US); Río Chiquito, *Standley & Chacón 5221* (F); Rio Selán, *Valerio 2844* (F); Rio Selguapa, *Valerio 2563* (F); Siguatepeque, *Allen 6191* (EAP), *Edwards 587* (F, US), *Standley 55950* (F, US), *Standley & Chacón 6101* (F), *6710* (F), *Valerio 2673* (F), *Yuncker, Dawson & Youse 5529* (F, GH, MO). CHOLUTECA: Río Pespire, *Williams & Molina 11528* (F, GH, MO), *Williams, Molina & Padilla 2079* (F). ISLAS DE LA BAHIA: Roatán, *Gaumer 87* (K). MORAZAN: Caparrosa River, *Standley 20538* (F), *Williams & Molina 11148* (F), *11887* F, GH, MO), *12711* (F, GH); Jicarito, *Standley 21066* (EAP, F), *Williams & Molina 4027* (F); Jicarito River, *Glassman 1695* (EAP, F); Las Mesas, *Molina 312* (F); Monte de la Flor, *von Hagen & von Hagen 1131* (F, NY); Quebrade El Horno, *Molina 831* (F); San Francisco, *Williams & Molina 12198* (F, GH); San Juan del Rancho, *Standley 14327* (F); Santa Inés, *Valerio 486* (F); Villa Nueva, *Molina 84* (F); Zamorano, *Standley 1835* (F, MO), *3993* (F), *4988* (F), *Valerio 1153* (F). OLANCHO: Juticalpa, *Standley 17631* (F). YORO: Medina, Aguan River, *Yuncker, Koepper & Wagner 8621* (F, MO, NY).

NICARAGUA: CARAZO: Jinotepe, *Standley 8521* (F). CHINANDEGA: Ameya, *Maxon, Harvey & Valentine 7183* (US); *Corinto, Greenman & Greenman 5836* (MO). CHONTALES: Juigalpa, *Standley 9300* (F); La Libertad, *Standley 9142* (F); Río San Juan, *Oersted 4416* (F). GRANADA: Granada, *Baker 114* (GH, MO, NY, US), *595* (US), *837* (US); *Oersted 4424* (F); Las Isletas, *Oersted 4418* (F). JINOTEGA: Jinotega, *Standley 9692* (F). MANAGUA: Managua, *Garnier 59* (F), *4153* (F), *4182* (F). RIVAS: San Juan del Sur, *Torrey 5* (NY). ZELAYA: Braggman's Bluff, *Englesing 226* (F); Escondido River, *Long 180* (F); La Esperanza, Río Grande, *Molina 2123* (F). WITHOUT LOCALITY: *C. Wright s. n.* (GH, US).

COSTA RICA: ALAJUELA: Carrilos de Poás, *Brenes 20471* (F); Coyolar, *Standley 39987* (US), *40055* (US), *Wercklé s. n.* (US); Zarcero, *L. O. Williams 16564* (IAIAS). CARTAGO: La Carpintera, *Echeverria 404* (F), *Stork 2111* (F). GUANACASTE: Bebedero, *Brenes 12556* (F); Nicoya, *Tonduz 13855* (CR, GH, K, NY, US); Salinas Bay, *Pittier 2726* (CR, US); without locality, *Oersted 4423* (F). HEREDIA: Echeverría, *Pittier & Tonduz 2515* (CR, US); Rio Virila, *L. O. Williams 16047* (EAP, IAIAS). PUNTARENAS: Buenos Aires, *Tonduz 4988* (CR, US); Cascajal, *Holm & Iltis 220* (F); Pan de Azúcar, *León 1236* (CR); Río Ceibo, *Tonduz 3829* (CR). SAN JOSE: Alajuelita, *Echeverria 607* (CR, F); Desamparados, *Biolley 1018* (CR, US); El General, *Skutch 4695* (CR, F, MO, NY, US); Escazú, *Standley 32340* (US); La Uruca, *Pittier 358* (CR); La Verbena, *Tonduz 9078* (CR, US); Las Pavas, *Standley 36053* (US), *36072* (US); Río Tiribí, *Pittier 4258* (CR); San Francisco de Guadalupe, *Tonduz 8049* (US); San José, *Biolley 56* (F), *Greenman & Greenman 5505* (MO), *Standley 34817* (US), *39002* (US), *39008* (US); San Sebastián, *Standley 32696* (US), *49287* (NY, US). WITHOUT LOCALITY: *Oersted 14* (GH).

PANAMA: CANAL ZONE: Chiva-Chiva trail, *Maxon & Harvey 6581* (US), *Piper 5752* (US); Gatún, *Hayes 78* (GH), *258* (NY); Río Agua Salud, near Frijoles, *Piper 5866* (F, US); sabana of Panama, *Pittier 2538* (GH, NY, US); Trinidad River, *Pittier 3973* (F, GH, NY, US); Victoria Fill, *Allen 1704* (GH, NY, US). COCLE: LaPintada, *Allen 518* (GH, MO); Penonomé, *R. S. Williams 137* (NY, US), *334* (NY, US). CHIRIQUI: Boquete,

*Davidson 823* (F, MO). HERRERA: Ocú, *Allen 4069* (MO). PANAMA: Chepo, *Hunter & Allen 89* (F, GH, MO), *Klug 16* (F, US); Juan Díaz, *Allen 939* (F, GH, MO, US); Las Lajas, *Allen 1608* (GH, MO, NY, US); Las Sabanas, *Bro. Paul 178* (US); Las Sabanas to Matías Hernández, *Standley 31825* (NY, US), *31871* (US), *31889* (US); San José Island, *I. M. Johnston 630* (GH), *698* (GH), *1277* (GH); Monte Oscuro, *Zetek 349* (F). VERAGUAS Cañazas, *Allen 160* (MO, US). WITHOUT LOCALITY: *Seeman 520* (GH), *Hayes 1027* (NY, US).

A subspecific value is assigned here to *I. spuria* Willd. after comparing many specimens from Central and South America with the Antillean plants. (On the type sheet of *I. spuria* at Berlin, Urban wrote: "Ab *I. vera* Willd. certes non diversa"). As no important characters were found to separate the two entities, I follow an old idea of Bentham, who considered *vera, spuria,* and probably the *uraguensis* (which I did not examine) as subspecific concepts of a widely spread species, since intergradations occur in all directions and quite often morphological types that tend to have a local distribution, reappear isolated in other regions. *Inga eriocarpa,* for instance, has been reported from Colombia, *I. vera* from Guatemala, etc.

In southeastern Mexico, British Honduras and Guatemala, an interesting variant occurs that Pittier named *I. fissicalyx;* it appears also in Costa Rica and Panama. It is characterized by long calyces that often exceed the corolla, long peduncles and narrow, lanceolate, or falciform leaflets. The extreme of this entity is represented by *Liebmann 4442* from Colipa, Veracruz. In Mexico it intergrades gradually towards other types and in Guatemala towards a peculiar type of the highlands, *I. donnell-smithii* Pittier, characterized for its ferrugineous-tomentose calyces; similar forms occur in Honduras, Costa Rica and Colombia (*I. eriocarpoides* Britton & Killip). In southern Costa Rica and Panama some plants have pedicellate flowers, as was reported for the type of *I. spuria.*

46. INGA INGOIDES (Rich.) Willd. in L., Sp. Pl. **4:** 1012, 1806. (ex char.)

*Mimosa ingoides* Rich., Act. Soc. Hist. Paris **1:** 113, 1792. (Type *Le Blond s.n.,* not seen)
*Inga merianae* Splitg., Pl. Nov. Sur. 19, 1842 (*fide* Bentham). (Type *Splitgerber s.n.,* not seen)
*I. galibica* Duchass. & Walp., Linnaea **23:** 747, 1850. (ex char.; Type *Duchassaing 488,* not seen)
*Feuilleea ingoides* (Rich.) O. Ktze., Rev. Gen. Pl. **1:** 188, 1891.

*Trees* up to 22 m tall; branchlets terete or angulate, ferrugineous-tomentose to glabrate, lenticellate. *Leaves* with 3-5 (generally 3) pairs of leaflets; leaflets subcoriaceous, elliptic to lanceolate, rufescent when dry, the apex obtuse to acuminate, the base rounded, above dark, lustrous, pilose to glabrescent, the nerves slightly prominent and densely pilose, beneath paler, sparsely to densely pilose, the nerves very prominent, the upper pair obovate to cuneate-elliptic, 10-22 cm long, 6-9 cm wide, the lower pair elliptic to lanceolate, 3-7 cm long, 2-3 cm wide, the petiolules conic, 1-2 mm long, densely ferrugineous-tomentose; rhachis winged, 5-12 cm long, densely tomentose on the midrib, the wings well developed, cuneate or elliptic, the glands small, patelliform, less than 1 mm in diam; petiole terete, 1.5-2.5 cm long, densely ferrugineous-tomentose, the pulvinus darker; stipules elliptic, up to 7 mm long, glabrate, caducous. *Inflorescences* 1-4 corymbiform racemes, axillary

or terminal; peduncle terete, slender, 2-8 cm long, ferrugineous-tomentose; rhachis irregular, sometimes thick, constricted, 1.5-3.0 cm long, the bracts ovate, about 2 mm long, caducous. *Flowers* markedly pedicellate, the pedicels 3-8 mm long, 1 mm in diam; calyx campanulate, 5-9 mm long, 4-5 mm wide, densely ferrugineous-tomentose, the teeth regular, obtuse to acute, 1-2 mm long; corolla tubular, deeply lobed, 10-16 mm long, appressed-pilose, the lobes obtuse, 4-5 mm long; staminal tube included, the filaments about 3 cm long; ovary oblong, sulcate, about 5 mm long, the style longer than the filaments. *Legume* terete, deeply sulcate when young, the marginal sides twice as broad as the valves, 12-35 cm long, densely ferrugineous-tomentose; seeds oblong, 1.0-1.5 cm long, 0.5 cm wide.

Guadeloupe to Trinidad. (South America, from Peru to the Guianas.)

Vernacular names: *pois-doux poilu* (Guadeloupe–Duss); *pois-doux marron* (Dominica–Beard); *pois-doux gris* (Martinique–Duss); *cacolie* (St. Lucia–Beard).

GUADELOUPE: Matouba, Camp Jacob, *Duss 3035* (NY, US); Morne Boucanier, *Duss 3229* (NY, US), *3601* (NY, US).

DOMINICA: Bellevue, *Eggers 644* (GH); Laudat, *J. S. Beard 654* (MO); Layou, *W. H. Hodge 610* (NY); Lisdora Estate, *G. P. Cooper III. 183* (GH, NY); Rosalie Valley, *Lloyd 707* (NY); Soufriere, *Eggers 110* (US); without locality, *Imray s. n.* (GH).

MARTINQUE: Case Pilote, *Duss 1158* (NY); Lamantin, *Hahn 665* (GH).

ST. LUCIA: Grand Magazin, *P. Beard 1138* (GH, MO).

ST. VINCENT: Calvary, *Eggers 6818* (US).

TRINIDAD: Arena Gov. Forest, *Broadway s. n.* (F); 5857 (MO); Arima, *Eggers & Rensch s. n.* (US); Godineau River, *Britton 2919* (GH); La Brea, *Broadway s. n.* (GH); Maqueripe, *Britton, Britton & Hazen 192* (GH, US); Port-of-Spain. *Kuntze 899* (F, NY); St. Ann, *Broadway 5116* (F, MO); Tabaquite, *Broadway 9103* (MO); without locality, *Sieber distr. 171* (GH, MO), *Trin. Bot. Gard. s. n.* (US), *2842* (US).

*Inga ingoides* has a wide distribution in South America and may have reached the Lesser Antilles through Venezuela via Margarita Island. It is closely related to *I. vera* and *I. edulis*, and some few collections show certain intergrading between these species and the first. Many of the specimens attributed to *I. vera* have pedicellate flowers but lack the short, campanulate calyx and large leaves of *I. ingoides*.

47. INGA COCLENSIS Pittier, Contr. U. S. Nat. Herb. **18:** 211, 1916. (Type *R. S. Williams 405*)

*Trees*; branchlets terete, striate, densely ferrugineous-tomentose. *Leaves* with 4-8 pairs of leaflets; leaflets elliptic to lanceolate, the apex long-acuminate, the base obtuse to rounded, above lustrous, shortly and sparsely pilose, the nerves impressed and more pubescent, beneath densely pubescent, the hairs yellow, short and curved, the nerves very prominent, the upper pair lanceolate-elliptic, often asymmetric, 9-21 cm long, 2.5-8.5 cm wide, the basal pair lanceolate, 4-8 cm long, 3-5 cm wide, the petiolules conspicuous, terete, up to 5 mm long, tomentose to glabrescent; rhachis terete, stout, 17-29 cm long, densely ferrugineous-tomentose, the glands shortly stipitate, crateriform, up to 2 mm in diam, the rim glabrous; petiole terete, thicker at the pulvinar section, 2-4 cm long, tomentose to glabrescent; the stipules minute, ovate, less than 2 mm long, pubescent, deciduous. *Inflorescences* axillary or terminal, solitary or in groups of 2-3; peduncle terete, 3.0-3.5 cm long, tomentose; rhachis 2-6 cm long, the bracts minute, ovate, 1-2 mm long,

subpersistent. *Flowers* sessile, subcongested; calyx cupulate, 4-6 mm long, shortly lanose, the teeth obtuse, about 1 mm long, more pubescent; corolla tubular, 11-15 mm long, appressed-lanose, the lobes acute, 2-3 mm long; staminal tube slightly exserted. *Legume* subterete, straight or twisted, at maturity about 35 cm long, 2.5 cm in diam, densely ferrugineous-tomentose, the margins wider than the valves.

Atlantic lowlands, from Guatemala to Panama.

Vernacular names: *nacaspiro, cuje* (Guatemala–Standley).

GUATEMALA: IZABAL: Entre Ríos, *Standley 72586* (F, NY); Milla 49.5 to Cristina, *Steyermark 38392* (F); Puerto Barrios, *Standley 73048* (F), *73078* (F).

HONDURAS: ATLANTIDA: Tela, *Standley 54269* (F, US).

NICARAGUA: ZELAYA: Bluefields, Río Escondido, *Molina 1785* (F, GH).

PANAMA: CANAL ZONE: Barro Colorado Island, *Bangham 528* (F). COCLE: Bismarck, above Penonomé, *R. S. Williams 405* (NY, US).

*Inga coclensis* was described by Pittier from a detached branchlet with young fruits and associated by him, on the structure of the leaf rhachis, with *I. rubiginosa* DC. of South America and *I. eriorhachis* Harms of Costa Rica. At present it is impossible to see any close relationship uniting the three species and *I. coclensis* seems to have no strong affinities among the ser. INGA. The present description is thus based on Nicaraguan and Guatemalan material for the inflorescences and the legume characters observed in the Panamanian specimens. The former do not agree completely with the type but more closely with the Bangham collection. The apparent discontinuity in Costa Rica is noteworthy. This, and some slight morphological differences, suggests the possibility of two different species, one in northern Central America and the other in Panama. The material available does not justify this separation.

SECTION III. LEPTINGA Benth. in Hook., Lond. Jour. Bot. **4:** 579, 1845.

§ *Diadema* Benth. in Hook., loc. cit. 583.

*Trees*; leaves large or small, glabrous or pubescent. *Inflorescences* shortly to long-pedunculate, the peduncle stout or slender. *Flowers* sessile or pedicellate, congested, the rhachis spheric or clavate, giving a capituliform or umbelliform appearance to the inflorescence. *Legume* flat.

Section LEPTINGA is formed by group of species that have in common the type of floral arrangement but in other characters do not seem to be clearly related. It is probably that the congestion of the floral racemes was attained in different groups in the genus, and that the present section is of polyphyletic origin.

SPECIES . . . 48-56

a. Calyx tubular, the teeth shorter than the tube; leaves and inflorescences not ferrugineous-setose; inflorescences on the young branchlets.
  b. Rhachis of the leaves winged or widely marginate.
    c. Calyx less than 5 mm long.
      d. Flowers with long and slender pedicels. Panama .....48. I. UMBELLIFERA
      dd. Flowers almost sessile, or the pedicels less than 1 mm long. Panama .....49. I. ALLENII
    cc. Calyx 20-25 mm long. Costa Rica and Panama .....50. I. PORTOBELLENSIS

bb. Rhachis of the leaves terete.
e. Branchlets, inflorescences, and fruits tomentose. Mexico to Panama .....51. I. QUATERNATA
ee. Branchlets, inflorescences, and fruits glabrous or slightly puberulous.
f. Flowers markedly pedicellate, the pedicels 4-14 mm. long; leaves with 1-2 (rarely 3) pairs of leaflets; legume less than 15 cm long. Panama; Trinidad .....52. I. HETEROPHYLLA
ff. Flowers sessile or very shortly pedicellate, the pedicels less than 3 mm long; leaves generally with 3-5 pairs of leaflets; legume more than 15 cm long.
g. Stipules large, persistent, 15-20 mm long; pedicels up to 3 mm long. Mexico to Costa Rica .....53. I. PATERNO
gg. Stipules short, caducous, up to 8 mm long; flowers sessile.
h. Calyx 4-5 mm long; corolla pilose, often deeply cleft to one side. Costa Rica .....54. I. MORTONIANA
hh. Calyx 1-3 mm long; corolla glabrous, regular. Mexico .....55. I. JINICUIL
aa. Calyx turbinate, the teeth longer than the tube; leaves and fruits ferrugineous-setose; flowers often in the old wood. Panama .....56. I. SAFFORDIANA

48. INGA UMBELLIFERA (Vahl) Steud., Bot. Nom. Phan. 431, 1821.

*Mimosa umbellifera* Vahl, Eclog. **3:** 30, 1807. (Type *von Rohr s.n.* photo)
*Inga sciadion* Steud., Flora **26:** 758, 1843. (Type *Hostmann & Kappler 170*)
*I. umbratica* Poeppig, Nov. Gen. Sp. Pl. **3:** 77, 1845. (Type *Poeppig s.n.* photo)
*I. myriantha* Poeppig, loc. cit. (Type *Poeppig s.n.*)
*Feuilleea myriantha* (Poeppig) O. Ktze., Rev. Gen. **1:** 188, 1891.
*F. sciadion* (Steud.) O. Ktze., loc. cit. 189.
*F. umbellifera* (Vahl) O. Ktze., loc. cit.
*F. umbratica* (Poeppig) O. Ktze., loc. cit.
*Inga gracilipes* Standley, Jour. Wash. Acad. Sci. **15:** 101, 1925. (Type *Standley* 30353)
*I. lawrenceana* Britton & Killip, Phytologia **1:** 23, 1933. (Type *Lawrence 260*)

Small *trees;* branchlets terete, shortly lanose when young, in age glabrate and densely lenticellate. *Leaves* with 2-3 pairs of leaflets; leaflets subcoriaceous, elliptic, often markedly oblique, the apex acute to acuminate, the acumen broad to triangular, the base broadly cuneate to rounded, above lustrous, glabrous, the 4-8 pairs of lateral nerves distant and prominent, the upper pair elliptic, 9-16 cm long, 4-6 cm wide, the lower pair elliptic-lanceolate, 4-6 cm long, 1-3 cm wide, the petiolules dark, 1-2 mm long, pilose or glabrous; rhachis winged, 2-11 cm long, sometimes with a linear apical appendage, the wings narrowly cuneate, broader above, becoming progressively obsolete to the base, the glands large, patelliform or subcupulate, about 2 mm in diam; petiole winged above, 1-3 cm long, glabrous or puberulent, the pulvinus black, conic; stipules linear-obovate, acute, about 5 mm long, sparsely pilose, subpersistent. *Inflorescences* axillary and solitary, or paniculate in terminal branchlets; peduncle slender, 1-5 cm long, glabrous or pilose, to woody and lenticellate; rhachis spheric, 3-4 mm long, the bracts spathulate, up to 2 mm long, pilose. *Flowers* greenish white, few to many, the pedicels slender, 7-15 mm long, sparsely pilose above; calyx cupulate-tubular, 3-5 mm long, sparsely pilose, the teeth very short and obtuse; corolla tubular-funnelform, 9-17 mm long, glabrous in the lower part, pilose at the lobes, lobes about 3 mm long; staminal tube exserted, the filaments about 1.5 cm long. *Legume* flat, oblong, 6-12 cm long, 1.5-2.5 cm wide, tomentose when young, in age glabrate.

Wet forests of the lowlands of Panama. (Brazil and Peru to the Guianas.)

PANAMA: CANAL ZONE: Barro Colorado Island, *Avilés 16* (F), *Bangham 488* (F), *Wood-Worth & Vestal* (F); France Field, *Standley 30353* (US).

The interpretation of variability of *I. umbellifera* is based on the study of photos of several types plus type specimens and numerous other collections from South America. The characters used in establishing some of the species here mentioned as synonyms are very unstable; they are mainly the kind of pubescence, relative length of pedicels, size of flowers, etc. Another reason for the creation of several species has been the lack of correlation between species described from the Guianas and those from Peru and Colombia. In this vast area *I. umbellifera* shows as much variability as the majority of the other South American species of *Inga*. The relation between this species and the *I. coriacea* Desv. complex is not clear at present.

49. INGA **ALLENII** J. León, sp. nov.

*Arbor* ca 15 m alta; ramulis teretibus, cortice albo. *Foliola* 3-juga elliptica apice longe acuminata acumen acuto ca 15 mm longo, basi acuta vel obtusa obliqua, supra opaca glabra minute punctata nervis lateralibus prominentibus, superiora cuneate elliptica 8-10 cm longa 3.0-3.5 cm lata, inferiora ovale elliptica 5.5-7.0 cm longa 2.5-3.0 cm lata, petiolulis brevibus ca 1 mm longis crassis glabris; rhachibus anguste alatis vel marginatis supra canaliculatis 5.0-6.5 cm longis, alis latioribus infra foliola, glandulis interfoliolaribus pyriformibus ca 3 mm longis glabris, foramine minuto albo; petiolis teretibus supra canaliculatis 2-3 cm longis glabris vel puberulis, pulvino crassiori ca 4 mm longo; stipulis oblongis ca 2 mm longis pubescentibus caducis. *Inflorescentiae* solitariae terminales vel axillares in ramulis brevibus, pedunculis gracilibus 3-4 cm longis puberulis; rhachibus globosis 3-4 mm diam; bracteis oblanceolatis 8 mm longis pilosis. *Flores* tenue pedicellati congesti; calyce tubuloso 2-3 mm long sparse piloso, dentibus inaequalibus cristatis; corolla tubulosa 6-7 mm long pilosa, lobis acutis 1.0-1.5 mm longis; tubo staminali incluso vel exserto filamentis ca 5 cm longis. *Legumen* ignota.

PANAMA: COCLE: hills north of El Valle de Antón, trail to La Mesa, about 1000 m elev., *Allen 2687* (HOLOTYPE US).

Allied to *I. mortoniana* in the structure of the leaves and inflorescence; easily separated on account of the shape of the glands and the winged rhachis.

50. INGA PORTOBELLENSIS Beurl., Svensk. Vet. Akad. Handl. **1854:** 122, 1856. (Type *Billberg 72*)

*Inga macrophylla* Billb. ex Beurl., loc. cit., pro syn., non Willd.

*Trees*, almost completely glabrous; branchlets terete, lenticellate. *Leaves* large, with 2 pairs of leaflets; leaflets coriaceous, obovate-oblong, the apex acute to long-acuminate, the acumen up to 2 cm long, the base acute, unequal, slightly cordate or revolute, above dark green, lustrous, except for the puberulent midnerve, the

nerves impressed, beneath paler, glabrous or sparsely pilose on the nerves and margin, the nerves prominent, the upper pair obovate-oblong to spathulate, 9-25 cm long, 6-10 cm wide, the lower pair oblong, 6-10 cm long, 3-5 cm wide; rhachis cuneately winged 5-12 cm long, with a terminal, linear, deciduous appendage up to 16 mm long and 2 mm wide, the glands shortly stipitate, hemispheric, pertuse; petiole short, 1-3 cm long, winged above, the pulvinus terete and thicker; stipules foliaceous, ovate to ovate-lanceolate, acuminate at the apex, cordate at the base, 6-18 mm long, 5-9 mm wide, solitary or in groups of 2-3, subpersistent. *Inflorescences* solitary, axillary; peduncle terete, 1-5 cm long, glabrous or puberulent, with an involucre of stipules, the bracts ovate-oblong, up to 12 mm long, caducous; rhachis spheric, about 3 mm in diam, with 8-20 flowers, the bracts spathulate 3-7 mm long, caducous. *Flowers* pedicellate, the pedicels thick, 4-5 mm long; calyx tubular-funnelform, 24-26 mm long, 10-12 mm wide, striate, glabrous except at the tips, the teeth 3 mm long, pilose; corolla tubular, 38-42 mm long, glabrous except at the tip of the lobes, the lobes 3-4 mm long, sparsely pilose; staminal tube very exserted, 40-45 mm long, the filaments about 2 cm long. *Legume* (immature) flat, oblong, curved, apiculate, about 19 cm long, 3 cm wide, the margins thick and slightly elevated.

Lowlands of Costa Rica and Panama.

COSTA RICA: PUNTARENAS: Playa Blanca, *M. Valerio 468* (CR, F); Santo Domingo de Golfo Dulce, *Tonduz 9879* (CR, GH, MO, NY, US).

PANAMA: CANAL ZONE: Río Pequení, between Salamanca and Río Boquerón, *Allen 17282* (GH, MO). COLON: Portobello, *Billberg 72* (photo, MO).

An outstanding species due to its large, glabrous flowers, globose inflorescence, and large, permanent stipules. It belongs to a group represented only in Brazil by two species: *I. cordistipula* Mart., with smaller and more numerous flowers, and *I. inflata* Ducke, especially noteworthy by its huge calyx. The Costa Rican specimens do not match Beurling's description well, especially in the size of the flowers. *Allen 17282* is a young specimen, the flowers in bud, with long and slender peduncles; it offers, however, the same type of inflorescence and leaves as the Tonduz collection.

51. INGA QUATERNATA Poeppig, Nov. Gen. Sp. Pl. **3:** 79, 1844. (ex char.)

*Feuilleea quaternata* (Poeppig) O. Ktze., Rev. Gen. Pl. **1:** 188, 1891.
*Inga maxoniana* Pittier, Contr. U. S. Nat. Herb. **18:** 174, 1916. (Type *Pittier 6012*)
*I. roussoviana* Pittier, loc. cit. 175. (Type *Pittier 5270*)
*I. williamsii* Pittier, loc. cit. 176. (Type *R. S. Williams 285*)
*I. schippii* Standley, Publ. Field Mus. Nat. Hist., Bot. Ser., **11:** 132, 1932. (Type *Schipp 538*)
*I. santanderensis* Britton & Killip, Ann. N. Y. Acad. Sci. **35:** 114, 1936. (Type *Killip & Smith 15477*)
*I. mutisii* Britton & Killip, loc. cit. (Type *Mutis 3644*)

*Trees* up to 15 m tall; branchlets terete, ferrugineous-tomentose to glabrous, lenticellate. *Leaves* with 3-4 pairs of leaflets; leaflets oblanceolate to ovate, the apex acute, truncate or ending in a short mucro, the base acute to obtuse, above lustrous and glabrous, or pubescent along the main nerves, beneath shortly pilose,

the distant nerves prominent, the upper pair narrowly oblanceolate to obovate to elliptic, 7-21 cm long, 3-7 cm wide, the lower pairs elliptic to ovate, the basal about half the size of the terminal pair, the petiolules thick, terete, 1-3 mm long; rhachis terete, 3-8 cm long, tomentose to glabrescent, the glands stipitate, disciform or patelliform, often obsolete; petiole terete, 1-3 cm long, the pulvinus conic and thicker; stipules obcordate, 1.0-1.5 mm long, tomentose, caducous. *Inflorescences* solitary and axillary, or terminal on the new shoots; peduncle terete, 2.5-3.5 cm long, densely ferrugineous-tomentose; rhachis short, clavate, 1-3 mm long, giving to the inflorescence a capituliform appearance, the bracts conspicuous, the lower ones obovate, the upper spathulate, up to 2.5 mm long, pilose outside, subpersistent. *Flowers* sessile to long pedicellate, the pedicels slender, obsolete to 9 mm long, ferrugineous-pubescent; calyx tubular to tubular-subcampanulate, 2-7 mm long, pubescent, the teeth spreading, 1.0-2.5 mm long; corolla tubular-funnelform, 5-11 mm long, appressed-pubescent, the lobes 1-2 mm long; staminal tube included or exserted. *Legume* flat, oblong, apiculate at the apex, rounded at the base, 3-18 cm long, 2-3 cm wide, about 1.5 cm thick when mature, densely ferrugineous-pubescent when young, in age glabrate or thinly pilose, the margins elevated.

Wet lowlands, from 0-600 m elev., from Mexico to Panama. (South America.)

Vernacular names: *acotopillo de montaña* (Veracruz-Ll. Williams); *guabito cansa boca* (Panama-Standley).

Mexico: veracruz: Fortuño, *Ll. Williams 8472* (F).

British Honduras: Banana Creek, Cockscomb Mts., *Schipp 538* (F, MO); Camp 31, *Schipp 1283* (F, GH, MO).

Guatemala: izabal: Quiriquá, *Standley 23954* (US), *23956* (NY, US).

Honduras: atlantida: La Ceiba, *Yuncker, Koepper & Wagner 8337* (F, GH, MO, NY, US), *8564* (F, GH, MO, NY, US); Lancetilla, *Standley 56834* (F, NY, US); Puerto Sierra, *P. Wilson 41* (NY); Tela, *Standley 56619* (F, US).

Costa Rica: cartago: Las Vueltas, Tucurrique, *Tonduz 13125* (US). puntarenas: Sto. Domingo de Golfo Dulce, *Tonduz 10032* (CR, GH, NY, US).

Panama: bocas del toro: Changuinola Valley, *Cooper & Slater 13* (F, US), *Stork 272* (US). canal zone: Barro Colorado Island, *Bangham 512* (F, US), *Bailey 270* (F, GH), *Brown 71* (F), *171* (F), *Dodge & Allen 17049* (GH), *Kenoyer 364* (US), *365* (US), *Killip 40022* (MO, US), *Shattuck 1128* (F), *Steyermark & Allen 16781* (GH), *Wetmore & Abbe 40* (F, GH), *97* (F, GH), *101* (F, GH), *Woodworth & Vestal 383* (F), *569* (F), *616* (F), *Zetek 3579* (F), *3586* (F), *3827* (F), *3929* (F, MO); France Field to Cativa1, *Standley 30170* (US), *30335* (US). chiriqui: San Félix, *Pittier 5270* (GH, US). cocle: Penonomé, *R. S. Williams 285* (US).

The interpretation of this species is based on Poeppig's ample description, since the type was not available for my study. *Inga quaternata* is one of the most variable species in this genus and has been the basis of indefinite segregates based on the varying shape of leaflets, length of peduncles and pedicels, type of pubescence, etc. The three characters mentioned, however, have a wide variation in the same specimen: *Pittier 5270*, for instance, has pedicels that vary from 5 to 38 mm in length. In central Panama the trend is towards smaller and rounded leaflets, short peduncles and almost sessile flowers, but there occur all intermediates; in British Honduras and Guatemala the leaflets are larger and the peduncles longer. There are all types of intergradation in South America also, such as among *I. wittiana* Harms, *I. pardoana* Harms, *I. boliviana*, Rusby, *I. conglomerata* Benoist

and *I. mathewisiana* Benth., which are probably but local variants within a wide complex.

Another problem arises in the relationship of *I. quaternata* Poeppig and *I. nobilis* Willd. The basic character to set them apart, even in different sections, is the clavate type of receptacle in the first, a definite raceme in the second. The floral bracts are alike, however, and in fruit or sterile condition they are impossible to tell apart (cf. Publ. Field Mus. Nat. Hist., Bot. Ser., **13**(3): 33, 1943). Only more collections will clarify this interesting relationship.

52. INGA HETEROPHYLLA Willd. in L., Sp. Pl. **4:** 1020, 1806. (Type *Hoffmansegg s.n.* photo)

*Mimosa parae* Poir. in Lam., Encycl. Suppl. **1:** 44, 1810. (ex char.)
*Inga umbellata* G. Don, Hist. Dichl. Pl. **2:** 391, 1832. (ex char.)
*I. protracta* Steud., Flora **1843:** 758, 1843. (Type *Hostmann & Kappler 1194*)
*Feuilleea heterophylla* (Willd.) O. Ktze., Rev. Gen. Pl. **1:** 188, 1891.
*F. stenocarpa* (Spruce) O. Ktze., loc. cit. 189.
*Inga mapiriensis* Pittier, Contr. U. S. Nat. Herb. **18:** 174, 1916. (Type *Buchtien 1768*)

Small *trees;* branchlets terete, striate, puberulent to completely glabrous, lenticellate. *Leaves* small, in the fertile branches with 1 or rarely 2 pairs of leaflets, in the sterile branches with 3-4 pairs; leaflets subcoriaceous, ovate to lanceolate-elliptic, the apex markedly attenuate and acuminate, shortly mucronate, the base cuneate, above dark green, lustrous, glabrous, the nerves slightly prominent, beneath paler, glabrous, the nerves prominent and finely reticulate, the upper pair elliptic to lanceolate, strongly oblique, 3-8 cm long, 2.5-3.0 cm wide (apparently somewhat larger in South America), the lower pair considerably shorter, 2-5 cm, 1.0-2.5 cm wide, the petiolules terete, up to 2 mm long, glabrous; rhachis terete, obsolete to 2 cm long, glabrous, the glands minute, hemispheric, pertuse at the apex, less than 1 mm in diam; petiole terete, 0.5-1.0 cm long, the pulvinus conic and darker; stipules linear, 2-3 mm long, caducous. *Inflorescences* umbelliform, axillary on the terminal branchlets, solitary or in groups; peduncle very slender, 0.7-1.5 cm long, glabrous; rhachis spheric or clavate, 2-4 mm long, pilose to glabrous, the bracts small, triangular, caducous. *Flowers* few to many in each umbel; pedicels slender, 4-12 mm long, glabrous; calyx cupulate, 0.7-1.5 mm long, glabrous except at the tips of the segments, the teeth minute, pilose; corolla white, tubular, slender, 4.5-6.0 mm long, glabrous, the lobes spreading, 1-2 mm long; staminal tube included to slightly exserted, the filaments about 1 cm long. *Legume* flat, oblong, straight or curved, apiculate, stipitate, 7-14 cm long, 1-2 wide, glabrous, the margins slightly prominent.

Lowland forests and bushlands of Trinidad and Panama. (Northern South America, Peru and Brazil, sometimes in xerophytic habitats.)

PANAMA: COCLE: Bismarck, above Penonomé, *R. S. Williams 600* (NY).
TRINIDAD: Aripo, road via Arima, *Broadway 5839* (MO); woods at Omora, *Eggers 1416* (US); without locality, *Herb. Bot. Gard. Trin. 1032* (US).

This is a remarkable species allied to a South American complex including *I. tarapotensis* Benth., *I. lateriflora* Miquel, *I. panuriensis* Benth., etc. The Panamanian

plant, referred previously to *I. laurina* (Sw.) Willd. (= *I. fagifolia*) was first attributed to *I. heterophylla* by Schery (Ann. Missouri Bot. Gard. **37:** 194, 1950). It is a mature specimen, in fruit, slightly different from the South American specimens in foliage characters, but the stipitate fruit and spheric receptacle ally it undoubtedly to *I. heterophylla.*

53. INGA PATERNO Harms in Fedde, Rep. Sp. Nov. **13:** 419, 1914. (ex ic.; Type *Preuss 1387*) [cf. Preuss, Exp. Central- und Sudamer. *pl. 8, fig. 6, pl. 9,* 1901] *I. radians* Pittier, Contr. U. S. Nat. Herb. **18:** 178, 1916. (Type *Cook 805*)

*Trees* 8 to 15 m tall; branchlets terete or costate, glabrous, lenticellate. *Leaves* with 3-5 (generally 4) pairs of leaflets; leaflets coriaceous, obovate to lanceolate, the apex acute to long-acuminate, the base acute to rounded, sometimes decurrent, above lustrous, glabrous, the 5-8 pairs of lateral nerves prominent, beneath paler, glabrous, the nervation conspicuous, the upper pair elliptic to obovate, 7-18 cm long, 3-7 cm wide, the basal pair lanceolate-oblong to obovate, 6-10 cm long, 3-4 cm wide, the petiolules conic, canaliculate, 4-6 mm long, pilose, rhachis terete or slightly angulate, sometimes with margins in the upper sections, 8-16 cm long, glabrous to sparsely pilose, ending in a filiform appendix, up to 11 mm long, the glands cupuliform, sessile or stipitate, very often obsolete; petiole terete, 1.5-3.0 cm long, glabrous to sparsely pilose, the pulvinar section thicker and darker; stipules obovate to oblong, rounded or obtuse at the apex, 10-20 mm long, striate, glabrous, persistent. *Inflorescences* axillary, paniculate on short branches, or solitary; peduncle slender, 2-8 cm long, striate, sparsely pilose to glabrescent; rhachis spheric, 3-5 mm in diam, the bracts spathulate, 1 mm long, pilose. *Flowers* congested in umbelliform inflorescences, with pedicels from 0.5-3.0 mm long; calyx tubular, 1.5-2.0 mm long, glabrous or very sparsely pilose, the teeth acute, 0.5 mm long, tufted; corolla tubular to slightly funnelform, 4.0-7.5 mm long, glabrous to sparsely pilose, the lobes acute to obtuse, 1-2 mm long, tufted; staminal tube included or exserted, the filaments 0.5-1.0 cm long. *Legume* flat, depressed between the seeds, up to 40 cm long, 7 cm wide and 3 cm thick, transversely striate, glabrous, the margins elevated; seeds oblong, 5 cm long, 2 cm wide, covered by thick, white, and succulent aril.

Mexico to Salvador; cultivated in Honduras and Costa Rica.

Vernacular names: *cuil machetón* (Oaxaca); *paterno* (Guatemala, Salvador, Costa Rica); *guabo caite* (Costa Rica).

MEXICO: CHIAPAS: Acacoyagua, Escuintla, *Matuda 16496* (EAP, F); Monte Ovando, *Matuda 2075* (F); Tapachula, *Cook 805* (US); OAXACA: Concordia, *Morton & Makrinius 2414* (F, US), *2528* (F, US); Oaxaca, *Conzatti & González 1146* (GH), *Nelson 349* (US); San Andres Tuxtla, *Nelson 487* (US); Talea, *Galeotti 1* (F). VERACRUZ: Chinameca, *Orcutt 3279* (F).

GUATEMALA: ALTA VERAPAZ: Cobán, *Standley 91215* (F), *91218* (F); *91304* (F); El Tambor, *Tejada 339* (US); Sepacuité, *Cook & Griggs 42* (US), *100* (US), *655* (US), *783* (US). ESCUINTLA: Escuintla, *J. D. Smith 2820* (US). EL PROGRESO: Piamonte, *Steyermark 43746* (F). EL QUICHE: San Miguel Uspatán, *Heyde & Lux 3309* (GH, US). GUATEMALA: Chinantla, *J. D. Smith 2819* (GH, US). PETEN: La Libertad, *Aguilar 377* (F, MO). QUEZALTENANGO: Finca Pirineos, *Steyermark 33398* (F). SAN MARCOS: El Porvenir, *Steyer-*

*mark 37189* (F). SANTA ROSA: Barberena, *Hedye & Lux 3280* (GH, US); Cuajiniquilapa, *Heyde & Lux 6122* (GH, NY, US). SUCHITEPEQUEZ: Cocales, *Standley 62069* (F).

SALVADOR: LA LIBERTAD: Sta. Tecla, *Lévy 787* (EAP). SAN SALVADOR: San Salvador, *Calderón 1641* (US), *283* (GH, NY, US), *284* (F, GH, MO, NY, US), *1642* (US), *Standley 21756* (F, GH, MO, NY, US), *23563* (GH, NY, US). SONSONATE: Sonsonate, *Standley 22326* (GH, US).

HONDURAS: COMAYAGUA: Siguatepeque, *Standley & Chacón 6664* (F). EL PARAISO: Güinope, *Williams & Molina 9032* (GH, F).

NICARAGUA: MANAGUA: Sierra de Managua, *Uribe 434* (US).

COSTA RICA: ALAJUELA: Alajuela, *J. D. Smith 6490* (US). CARTAGO: Cartago, *Torres 96* (F), *97* (F); Turrialba, *Holdridge 2556* (IAIAS), *León 2792* (IAIAS). SAN JOSE: Escazú, *Solís 186* (CR, F, MO), *289* (CR, F, MO); San José, *Cook & Doyle 15* (US).

Pittier discusses this species at length (Contr. U. S. Nat. Herb. **18:** 178, 1916) and divides it into two: *I. paterno* Harms which he restricts to the highlands of Guatemala and Costa Rica, and *I. radians* found in the Pacific lowlands of Guatemala, Chiapas and Oaxaca. The separation is based on legume characters, established probably on abnormal fruits which are frequently due to the malformation of seeds. In the other characters used by Pittier there are intermediates that also invalidate the separation.

There is a close relationship between *I. paterno* and *I. jinicuil,* if indeed they are not the same species. But with the available specimens it is inadvisable to join them since they differ constantly in size and persistency of the stipules, size and shape of the calyx, and number and shape of the leaflets. It is quite probable that this separation will disappear once more when collections are made in Chiapas, Veracruz, and Oaxaca.

*Inga paterno* is the only Central American species that has a fruit of good quality; for this reason the center of origin is difficult to ascertain and the cultivated area extends now from Mexico to Costa Rica. It was the first *Inga* planted for shading coffee; but a high susceptibility to a kind of witches-broom disease, and the damage made to the coffee trees by people who collect legumes, is causing the abandoning of its cultivation.

54. INGA **MORTONIANA** J. León, sp. nov.—Fig. 6.

*Arbor* 12-15 m alta; ramulis teretibus sulcatis vel bullatis glabris vel puberulis cortice albo lenticellato. *Foliola* 3-juga subcoriacea elliptica vel lanceolato-elliptica, apice acuta, basi obtusa vel subacuta in petiolam decurrentia, supra nitida glabra nervis prominentibus, subtus palliodoria glabra nervis prominentibus sparse pilosioribus nervationi reticulato conspicuo, superiora elliptica 9-17 cm longa 4-6 cm lata, inferiora lanceolata elliptica plerumque obliqua 4.5-9.0 cm longa 2.5-4.0 cm lata, petiolulis crassis angulatis fuscis 4-6 mm longis glabris; rhachibus teretibus vel angulatis 3.5-10.0 cm longis glabris, glandulis interfoliolaribus cupuliformibus ca 1 mm altis, foramine angusto; petiolis teretibus 2-3 cm longis glabris pulvino crasso 1.0-2.5 cm longo. *Inflorescentiae* capituliformes solitariae vel geminatae plerumque axillares in ramulis lateralibus brevibus rarius terminales; pedunculis teretibus 4.0-7.5 cm longis sparse pilosis, rhachibus globosis ca 2 mm diam bracteis linearibus 2.5 mm longis pilosis deciduis. *Flores* tenue pedicellalti

Fig. 6. *Inga mortoniana* J. León

in capitulo aggregati; calyce cupulato tubuloso 5-7 mm longis tubo sparse piloso basim apicem dense piloso, dentibus obtusis plerumque inaequalibus 0.5-1.5 mm longis; corolla tubulosa supra dilatata 9-11 mm longa appresse pilosa, lobis acutis 1.5-2.5 mm longis; tubo staminali exserto filamentis ca 1 cm longis; ovarium oblongum ca. 1.5 mm longum glabrum. *Legumen* oblonga lata 12 cm longa 4 cm lata transverse striata glabra.

Cloud forests of central Costa Rica from 1100 to 1500 m elevation.
Vernacular name: *guaba-maría* (Costa Rica—A. Smith).

COSTA RICA: ALAJUELA: Buena Vista, San Carlos, *Barquero* 3 (IAIAS); La Palma, San Ramón, *Brenes 5516* (F); Tapezco, Zarcero, *A. Smith 1230* (F, HOLOTYPE NY); San Luíz, Zarcero, *A. Smith 170* (NY, MO); Vara Blanca, *Skutch 3315* (MO, NY), *3763* (MO, NY), *3780* (MO); Zapote, Zarcero, *A. Smith 2894* (EAP); Zarcero, *A. Smith 459* (F, MO, US).

This remarkable species, named in honor of Mr. C. V. Morton, U. S. National Herbarium, belongs to the group of *I. paterno* and *I. jinicuil* of northern Central America, but differs from both in the length and structure of the flowers and the number and shape of the leaflets. The spheric rhachis of the inflorescence is definitely of the LEPTINGA type.

55. INGA JINICUIL Schlecht., Linnaea **12:** 559, 1838. (Type *Schiede 675*)

*Trees;* branchlets terete or angulate, glabrous, conspicuously lenticellate. *Leaves* with 3 pairs of leaflets; leaflets coriaceous, elliptic to lanceolate, acute to rounded, often asymmetric at the apex, the base acute to obtuse, oblique, decurrent, above lustrous, glabrous except along the pilose costa, the 5-7 pairs of lateral nerves distant and slightly prominent, the tertiary nervation conspicuous, beneath dull, glabrous, the nerves not markedly prominent, the upper pair elliptic, 8-15 cm long, 3-6 cm wide, the lower pair lanceolate-elliptic, 3-7 cm long, 1-5-3.0 cm wide, the petiolules dark conic, 2-4 cm long sparsely pilose; rhachis terete, 4-7 cm long, glabrous, lenticellate in the lower part, the glands orbicular, pedicellate or sessile, often obsolete; petiole terete, 1.5-2.0 cm long, glabrous, striate, lenticellate, the pulvinus conic and darker, 3-4 mm long; stipules oblong, 8 mm long, 3 mm wide, glabrescent, caducous. *Inflorescences* in groups of 3-7, rarely solitary, axillary generally below the new growth; peduncle slender, terete, 2-8 cm long, striate, glabrous to sparsely pubescent; rhachis globose, 3-4 mm in diam; *flowers* sessile or very shortly pedicellate, the pedicels up to 0.5 mm long; calyx campanulate, 1.0-2.5 mm long, glabrous or sparsely pubescent, the teeth short, acute, with tufts or hairs at the tips; corolla funnelform, 3-7 mm long, glabrous, the lobes 1.0-1.5 mm long, sparsely pubescent at the tips; staminal tube generally included, the filaments 6-8 mm long. *Legume* (*fide* Schiede) oblong, straight or curved, 15 cm long, 2.5 cm wide, glabrous.

Highlands of Veracruz and Michoacán, from 600 to 1200 m elevation.
Vernacular name: *jinicuil.*

MEXICO: MICHOACAN: Coahuayula, *Emrik* 38 (F). VERACRUZ: Colipa, *Liebmann 4440* (F); Córdoba, *Bougeau 2043b* (GH, K); Jalapa, *Pringle 8134* (F, GH, MO, NY, US), *Schiede 675* (F, GH, MO), *C. L. Smith 1438* (EAP, NY); Orizaba, *Bilimek 137* (GH), *Mohr 1765* (US); Teocelo, *Goldman 690* (US); Zacualpán, *C. A. Purpus 6325* (F, GH, NY).

*Inga jinicuil* is found in cultivation in the eastern side of Mexico, especially around the Indian dwellings in Veracruz. The area of origin is unknown. The large fruits have seeds with thick and sweet arils, and are often sold in the markets. The relationship between this species and its western relative, *I. paterno,* is discussed under the last species.

56. INGA SAFFORDIANA Pittier, Contr. U. S. Nat. Herb. **18:** 176, 1916. (Type *Pittier 5676*)

Low *trees*, with long, pendant branches; branchlets terete, striate, densely setose, lenticellate. *Leaves* with 4-5 pairs of leaflets; leaflets subchartaceous, ovate to obovate-elliptic, the apex acute to acuminate, the acumen linear, ciliate, about 4 mm long, the base oblique, cuneate, above sublustrous and glabrous except at the ciliate margins, the nerves slightly prominent, beneath sparsely setose but more densely on the costa and main nerves, lateral nerves 6-9, ascending, prominent, the intercalary nervation conspicuous, the upper pair spathulate to obovate-elliptic, 7-8 cm long, 2-3 cm wide, the lower pair lanceolate, 4.5-5.0 cm long, 2.5-3.0 cm wide, the petiolules about 2 mm long, sparsely setose; rhachis terete, 16-17 cm long, striate, setose, the glands long stipitate, 2.5-3.0 mm long, glabrous, pertuse and thicker at the apex, the terminal appendix linear, about 5 mm long, ciliate; petiole terete, 2.5-3.0 cm long, striate, densely setose, the pulvinus fleshy, 4-5 mm long, lustrous; stipules subulate, 5-14 mm long, setose, persistent. *Inflorescences* globose, long-pedunculate, cauliflorous (?) or on short spurs; peduncle slender, 4-12 cm long, setose; rhachis spheric, 2-3 mm in diam, the bracts subulate, bristly, about 5 mm long, the lowermost persistent. *Flowers* long-pedicellate; calyx (persistent in the immature fruits) conic, about 12 mm long, sparsely setose, the teeth subulate, about 11 mm long; corolla tubular, dilating above, 16 mm long, very sparsely pilose, the lobes 2.5 mm long, more pubescent. *Legume* (immature) flat, oblong, apiculate at the apex, cuneate at the base, 26-33 cm long, 2.5-3.0 cm wide, densely ferrugineous-setose.

Lowlands of western Panama. (Colombia?)

PANAMA: DARIEN: Cerro de Garagará Sambú basin, *Pittier 5676* (US).

This poorly known species is unique in the genus in having cauline inflorescences; this important character plus the shape of the leaves and structure of the flower, put it in a group by itself apart from any known species. Although its position within LEPTINGA is justified by the type of inflorescence, it has some characters of the indument and structure of the calyx that recall some species of § INGA (viz. ser. PILOSIUSCULAE). A Colombian collection (*A. Fernández 267*) from the Chocó, in the same general region where *I. saffordiana* was found, is the most comparable specimen seen. However it has only 2-3 pairs of leaflets and the slender, long-pedunculate inflorescences are born on the branchlets; the flower and type of indument are very similar to *I. saffordiana*.

Several South American species of *Inga* are found in cultivation at the botanic gardens and experiment stations in the West Indies, mainly in relation to their value as fruit trees or in connection to the use as shade trees for coffee and cacao.

INGA SPECTABILIS Willd.

CUBA: SANTA CLARA: Soledad Garden, *J. G. Jack 8501* (US).

INGA FASTUOSA Willd.

CUBA: SANTA CLARA: Soledad Garden, *J. G. Jack 8472* (US). PUERTO RICO: MAYAGUEZ: Mayagüez, *Toro 13* (NY).

INGA QUATERNATA Poeppig.

PUERTO RICO: MAYAGUEZ: Mayagüez, *Toro 11* (NY).

## Excluded Species

Martens & Galeotti, (Bull. Acad. Brux. 10, **2:** 318-321, 1843) described the following species from Mexico: *Inga? sericea* Mart. & Gal. (loc. cit. 318); *I.? nitens* Mart. & Gal. (loc. cit.); *I. laevigata* Mart. & Gal. (loc. cit.); *I. speciosa* Mart. & Gal. (loc. cit. 320); and *I. elegans* Mart. & Gal., (loc. cit. 321). From the descriptions it is clear that none belong to *Inga* and probably most of them are referable to *Calliandra*.

*Inga anomala* Kunth, Mim. 70, 1819 = *Calliandra grandiflora* (L'Her.) Benth. in Hook., Lond. Jour. Bot. **2:** 139, 1840.

*I. billbergiana* Benth., in Hook., Lond. Jour. Bot. **4:** 585, 1845 = *Pithecellobium rufescens* (Benth.) Pittier, Contr. U. S. Nat. Herb. **18:** 181, 1916.

*I. canescens* Cham. & Schl., Linnaea **5:** 592, 1830 = *Calliandra canescens* (Cham. & Schl.) Benth. in Hook., Lond. Jour. Bot. **3:** 96, 1844.

*I. cognata* Schl., Linnaea **12:** 560, 1838 = *Pithecellobium cognatum* (Schl.) Benth. in Hook., Lond. Jour. Bot. **5:** 107, 1846.

*Inga coriacea* G. Don, Gen. Hist. Dichl. Fl. **2:** 390, 1832. (Type *Mociño & Sessé s.n.* in herb. Lamb., Mexico). The type was not available and the description is insufficient to refer it to any of the other species of *Inga* occurring in Mexico.

*I. cyclocarpa* (Jacq.) Willd. in L., Sp. Pl. **4:** 1026, 1806 = *Enterolobium cyclocarpum* (Jacq.) Griseb., Fl. Brit. W. Ind. 226, 1861.

*I. emarginata* Willd. in L., Sp. Pl. **4:** 1009, 1806 = *Calliandra emarginata* (Willd.) Benth. in Hook., Lond. Jour. Bot. **3:** 95, 1844.

*I. englesingii* Standl., Trop. Woods **17:** 27, 1929 = *Pithcellobium englesingii* (Standl.) Standl., Trop. Woods **34:** 40, 1933.

*I. foetida* (Jacq.) Willd. in L., Sp. Pl. **4:** 1008, 1806 = *Piptadenia foetida* (Jacq.) Benth., Trans. Linn. Soc. **30:** 366, 1875.

*I. fragrans* Macfay, Fl. Jamaica **1:** 309, 1837 = *Acacia berteriana* (Benth.) Fawc. & Rendle, Fl. Jamaica **4:** 145, 1920.

*Inga gigantifoliola* Schery, Ann. Missouri Bot. Gard. **37:** 218, *fig.* 83, 1950 = *Pithecellobium* **GIGANTIFOLIOLUM** (Schery) J. León, comb. nov. This plant undoubtedly belongs to *Pithecellobium* because of its twice-pinnate leaves. This is easily seen in the type specimen (*von Wedel 2349*, MO) and more clearly in a collection from Livingston on the Reventazón, Prov. of Limón, Costa Rica (*Rowlee & Stork 793*). Here also belongs *Tonduz 9176* from Shirores, Talamanca, Costa Rica, in the same general region as the type collection.

*I. globulifera* Benth. in Hook., Lond. Jour. Bot. **4:** 585, 1845 = *Pithecellobium rufescens* (Benth.) Pittier, Contr. U. S. Nat. Herb. **18:** 181, 1916.

*I. guadalupensis* Desv., Jour. Bot. **1:** 70, 1814 = *Pithecellobium unguis-cati* (L.) Benth. in Hook., Lond. Jour. Bot. **3:** 200, 1844.

*I. guatemalensis* Hook. & Arn., Bot. Beechey Voy. 419, 1841 = *Mimosa guatemalensis* (Hook. & Arn.) Benth., Bot. Voy. Sulph. 89, 1844.

*I. houstoni* DC., Prodr. **2:** 442, 1825 = *Calliandra houstoniana* (Mill.) Standl., Contr. U. S. Nat. Herb. **23:** 386, 1922.

*I. latifolia* Willd. in L., Sp. Pl. **4:** 1020, 1806 = *Pithecellobium latifolia* Willd. in L., Sp. Pl. **4:** 1020, 1806 = *Pithecellobium latifolium* (L.) Benth. in Hook., Lond. Jour. Bot. **3:** 214, 1844.

*I. leucantha* Presl, Bot. Bemerk. 65, 1844 = *Pithecellobium dulce* (Roxb.) Benth. in Hook., Lond. Jour. Bot. **3:** 199, 1844.

*I. macrocarpa* M. E. Jones, Contr. Western Bot. **15:** 140, 1929 = *Hymenaea courbaril* L., Sp. Pl. 1192, 1753.

*I. membranacea* Benth., Trans. Linn. Soc. **30:** 606, 1875 = *Pithecellobium membranaceum* (Benth.) Schery, Ann. Missouri Bot. Gard. **37:** 228, 1950.

*I. patens* Hook. & Arn., Bot. Beechey Voy. 419, 1841 = *Entada patens* (Hook. & Arn.) Standl., Contr. U. S. Herb. **23:** 349, 1922.

*I. peckii* Robinson, Proc. Amer. Acad. Sci. **49:** 502, 1913 = *Pithecellobium belizense* Standl., Publ. Field Mus. Nat. Hist., Bot. Ser., **4:** 212, 1929.

*I. pennatula* Cham. & Schl., Linnaea **5:** 593, 1830 = *Acacia pennatula* (Cham. & Schl.) Benth. in Hook., Lond. Jour. Bot. **1:** 390, 1842.

*I. pungens* Willd. in L., Sp. Pl. **4:** 1044, 1806 = *Pithecellobium dulce* (Roxb.) Benth. in Hook., Lond. Jour. Bot. **3:** 199, 1844.

*I. purpurea* (L.) Willd. in L., Sp. Pl. **4:** 1021, 1806 = *Calliandra purpurea* (L.) Benth. in Hook., Lond. Jour. Bot. **3:** 104, 1844.

*I. rufescens* (Benth.) in Hook., Lond. Jour. Bot. **4:** 585, 1845 = *Pithecellobium rufescens* (Benth.) Pittier, Contr. U. S. Nat. Herb. **18:** 181, 1916.

*I. saman* (Jacq.) Willd. in L., Sp. Pl. **4:** 1024, 1806 = *Pithecellobium saman* (Jacq.) Benth. in Hook., Lond. Jour. Bot. **3:** 95, 1844.

*I. semicordata* Bertol., Fl. Guatem. 441, 1840 = *Calliandra emarginata* (H. & B.) Benth. in Hook., Lond. Jour. Bot. **3:** 95, 1844.

*I. speciosa* Mart. & Gal., Bull. Acad. Brux. 10, **2:** 320, 1843 = *Calliandra cumingii* Benth. in Hook., Lond. Jour. Bot. **2:** 140, 1840.

*I. stevensoni* Standl., Trop. Woods **23:** 7, 1930 = *Pithecellobium stevensoni* (Standl.) Standl. & Steyerm., Publ. Field Mus. Nat. Hist., Bot. Ser., **23:** 164, 1944.

*I. tergemina* Willd. in L., Sp. Pl. **4:** 1008, 1806 = *Calliandra tergemina* (Willd.) Benth. in Hook., Lond. Jour. Bot. **3:** 96, 1844.

*I. tetraphylla* G. Don, Hist. Dichl. Pl. **2:** 392, 1832 = *Calliandra tetraphylla* (G. Don) Benth., Trans. Linn. Soc. **30:** 554, 1875.

*I. tubulifera* Benth. in Hook., Lond. Jour. Bot. **4:** 584, 1845 = *Pithecellobium tubuliferum* (Benth.) Pittier, Contr. U. S. Nat. Herb. **18:** 181, 1916.

## ENUMERATION OF THE SPECIES OF INGA

Section I. BOURGONIA Benth.

1. *marginata* Willd.
2. *longispica* Standl.
3. *fagifolia* (L.) Willd. ex Benth.
4. *coruscans* Willd.
5. *belicensis* Standl.
6. *pezizifera* Benth.

Section II. INGA

Series 1. PUNCTATAE J. León

7. *punctata* Willd.
8. *yunckeri* Standl.
9. *latipes* Pittier
10. *martinicensis* Presl
11. *brevipedicellata* Harms

12. *dominicensis* Benth.
13. *pinetorum* Pittier

Series 2. MULTIJUGAE J. León
14. *multijuga* Benth.
15. *thibaudiana* DC.
16. *skutchii* Standl.
17. *ruiziana* G. Don

Series 3. DENSIFLORAE J. León
18. *densiflora* Benth.
19. *schiedeana* Steud.
20. *micheliana* Harms
21. *squamigera* J. León
22. *davidsoniae* Standl.
23. *stenophylla* Standl.
24. *tenuipedunculata* J. León
25. *barbourii* Standl.
26. *hintoni* Sandwith
27. *calderoni* Standl.

Series 4. LEPTANTHAE Benth., emend.
28. *cookii* Pittier

Series 5. ACUMINATAE J. León
29. *acuminata* Benth.

Series 6. PILOSULAE J. León
30. *pilosula* (Rich.) Macbride
31. *hayesii* Benth.
32. *venusta* Standl.

Series 7. CALOCEPHALAE Benth.
33. *mucuna* Walp. & Duchass.
34. *venosa* Griseb. ex Benth.

Series 8. GOLDMANIANAE J. León
35. *goldmanii* Pittier

Series 9. DYSANTHAE Benth.
36. *standleyana* Pittier

Series 10. SPECTABILES J. León
37. *spectabilis* (Vahl) Willd.

Series 11. VULPINAE Benth.
38. *tonduzii* J. D. Smith

Series 12. TETRAGONAE Pittier
39. *sapindoides* Willd.

Series 13. INGA
40. *pauciflora* Walp. & Duchass.
41. *brenesii* Standl.
42. *oerstediana* Benth. ex Seem.
43. *edulis* Mart.
44. *latibracteata* Harms
45. *vera* Willd.
45a. subsp. *vera*.
45b. subsp. *eriocarpa* (Benth.) J. León
45c. subsp. *spuria* (Willd.) J. León
46. *ingoides* (Rich.) Willd.
47. *coclensis* Pittier

Section III. LEPTINGA Benth.
48. *umbellifera* (Vahl) Steud.
49. *allenii* J. León
50. *portobellensis* Beurl.
51. *quaternata* Poeppig
52. *heterophylla* Willd.
53. *paterno* Harms
54. *mortoniana* J. León
55. *jinicuil* Schlecht.
56. *saffordiana* Pittier

## INDEX OF LATIN NAMES

New taxa are in **boldface** type, all other taxa are in roman type; numbers in **boldface** type refer to descriptions, numbers in roman type refer to synonyms, numbers with dagger (†) refer to names incidentally mentioned.